Encyclopedia of Alternative Investments

Edited by

Greg N. Gregoriou

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Introduction

The main objective of this encyclopedia is to be the most authoritative source on alternative investments for academics, students, professionals, and practitioners. The entries of the encyclopedia focus on hedge funds, managed futures, commodities, and venture capital written by well-known and respected academics and professionals from around the world.

Editor

Greg N. Gregoriou, PhD, is a professor of finance in the School of Business and Economics at State University of New York (Plattsburgh). He is hedge fund editor for the *Journal of Derivatives and Hedge Funds*, editorial board member of the *Journal of Wealth Management* and the *Journal of Risk Management in Financial Institutions*. He is the co-author of a book with Professor Joe Zhu entitled *Evaluating Hedge Fund and CTA Performance: Data Envelopment Analysis Approach* + CD-ROM, published by John Wiley & Sons, and has edited and co-edited 24 books for John Wiley & Sons, McGraw-Hill, Elsevier-Butterworth/Heinemann, Chapman & Hall/Routledge/Taylor & Francis, Palgrave-MacMillan, and Risk books. Dr. Gregoriou's articles have also appeared in the *Journal of Portfolio Management, Journal of Futures Markets, European Journal of Operational Research,* and the *Annals of Operations Research*. A native of Montréal, Professor Gregoriou obtained his joint PhD at the University of Québec at Montréal in finance, which merges the resources of Montréal's four major universities: University of Québec, McGill University, Concordia University, and HEC. Professor Gregoriou's interests focus on hedge funds, funds of hedge funds, and managed futures.

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A

Absolute Return

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Absolute return is the performance return an asset earns over a particular time period. This return is the ultimate product that an asset manager delivers to a particular client. It is important to note that this measurement of performance differs from a relative return in that it strictly looks at the appreciation or depreciation of an asset over a particular time frame, and does not compare to a market index or an asset class benchmark. Absolute return strategies will often use the risk-free rate (i.e., Treasury bill rate) as a benchmark, whereas relative return strategies will use a market index (i.e., S&P 500) (Lake, 2003). Investment vehicles, where absolute returns are offered and generated, are hedge funds and funds of hedge funds. Absolute return funds attempt to consistently produce positive returns regardless of the prevailing economic conditions and market drawdowns (Amenc et al., 2006). Generally, these returns are not highly correlated with price movements in different markets and are able to diversify a portfolio of traditional assets. Some absolute return investment techniques and strategies include the use of futures contracts, short selling, options, derivatives, arbitrage, and leverage. By using hedging, short selling, or arbitrage, absolute return strategies can generate gains in declining markets (Lake, 2003).

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Absolute Return Index

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During unfavorable general market conditions, many investors consider investment vehicles that offer a stable stream of returns (Brandt, 2005). This desire gave birth to absolute return funds, a class of hedge funds managed by means of strategies designed to reduce or eliminate the exposure to market-level systematic risk. Funds with these characteristics may be compared to an absolute return index that attempts to be characterized by stable performance unrelated to market conditions. Even if absolute return funds do not show a positive return in each single period, over a longer term-perspective, they aim at delivering positive absolute returns in both declining and rising markets, see e.g. Interfinancial Investment Brokers and Corporate Advisors (2005). Therefore, one interesting statistic regarding absolute return funds may be calculated as the percentage of periods such a fund ends up with absolute gains in value. Nevertheless, this type of alternative investment does not guarantee a minimum return.

Absolute return funds aim at good long-term returns with low volatility by using investment instruments such as bonds or investments across a wide range of asset classes. They may also enter short positions, see e.g. Ineichen (2002) or Moore (2007). Even if this fund type may show lower volatility, the invested money may be subject to substantial risk. The risk profile can vary from very conservative to aggressive depending on the investment strategy followed and on the securities the fund invests in. Absolute return funds may be appropriate for investors seeking diversification from nontraditional financial instruments and investment strategies.

In contrast to funds following a relative return strategy, the performance of absolute return funds should not be compared to that of traditional indices. First, absolute return funds aim at producing positive absolute returns rather than outperforming a given benchmark. Second, the funds are usually not based on traditional investment techniques as (i) they use investment strategies such as short sales or leverage, (ii) they can invest across a wide range of asset classes, and (iii) they are subject to fewer regulatory constraints than traditional mutual funds. This results in the observation that absolute return indices typically do not show high levels of correlation with traditional asset classes (see also Clifford, 2002).

Even if there is usually no comparison to traditional benchmarks, the continued growth of the alternative investment industry has increased the demand for a benchmark to compare absolute return funds with each other. Therefore, comparisons with cash benchmarks or peer groups are used. However, it is often difficult to find suitable peer funds as the investment strategies may be quite heterogeneous and as manager-specific factors have a high influence on the performance of such alternative indices, see e.g. Howie et al. (2003). An absolute return index may be used as a peer benchmark for absolute return funds or as an investment vehicle for investors looking for a stable performance development.

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Acceleration

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The actual sale of stock in an initial public offering on the offering date is supposed to come into effect 20 days after the Securities and Exchange Commission (SEC) has reviewed and approved the company's final registration statement (Ritter, 2003). However, the SEC may grant an acceleration to enable the sale of stock to become effective immediately. This acceleration minimizes the risk to the issuing company in periods where the stock market is highly volatile.

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Accredited Investor

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Accredited investor is a term defined by the U.S. securities laws that outlines which investors are allowed to participate in certain types of investment opportunities. These investors are often endowment investors, retirement plans investors, and wealthy individuals. This term is defined in Rule 501 of Regulation D under the Securities Act of 1933. Rule 501 of Regulation D describes an accredited investor as follows:

1. A bank, insurance company, registered investment company, business development company, or a small business investment company
2. An employee benefit plan within the meaning of the Employee Retirement Income Security Act, if a bank, an insurance company, or a registered investment adviser makes the investment decisions, or if the plan has total assets in excess of $5 million
3. A charitable organization, corporation, or partnership with assets exceeding $5 million
4. A director, an executive officer, or a general partner of the company selling the securities
5. A business in which all the equity owners are accredited investors
6. A person who has an individual net worth or a joint net worth with the person's spouse that exceeds $1 million at the time of the purchase

7. A natural person with income exceeding $200,000 in each of the two most recent years or joint income with a spouse exceeding $300,000 for those years, and a reasonable expectation of the same income level in the current year
8. A trust with assets in excess of $5 million, not formed to acquire the securities offered, whose purchases a sophisticated person makes (Securities Lawyer's Deskbook, 2007)

Once any of the above criteria is met, an investor has the option to invest in certain restricted offerings and limited partnerships, which often have unique liquidity and redemption terms. Examples of these offerings include hedge funds and hedge fund of funds. These requirements ensure that the investor has the capital to withstand lengthy lock-up periods and risky investment processes.

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Active Premium

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The evaluation of the return offered by a particular investment must be made in relation to the return of the benchmark that is taken as a reference. Active Premium is the difference between the annualized return of an investment and the annualized return of a benchmark:

$$\text{Active Premium} = \text{Investment's Annualized Return} - \text{Benchmark's Annualized Return}$$

From a financial point of view, these differential returns correspond to a zero-investment strategy, which consists in going long on the fund in question and short on the benchmark. Alternatively, one could swap the return on the benchmark for the return on the fund and vice versa (Lhabitant, 2004). This is a particularly versatile measurement, given that it allows the choice of the portfolio with which the investment to be evaluated is compared. It is useful in the calculation of the information ratio. This is a measure of performance developed by Nobel Prize winner William F. Sharpe, and is a revised version of the original Sharpe ratio, that evaluates the behavior of investment funds (Sharpe, 1994). It is calculated by dividing the "Active Premium" by the "Tracking Error." The Active Premium for each unit of risk is obtained, derived from the ability of the manager to use the information available to improve on the results of the references benchmark.

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Activists

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The concept of activists, or shareholder activists, is illustrated by hedge fund managers participating in exchange-traded companies via minority shareholding. Hedge fund managers do not follow a passive investment strategy; they intend to actively influence company management. The active investment concept here comes from Wyser-Pratte (2006), and is based on value investing, which is one of the basic investment principles. Just as value investors search for assets trading below market value because of market imperfections, active investors search for assets that are undervalued because of strategic and corporate governance reasons.

The investment process of an activist begins with a fundamental analysis to identify companies with solid balance sheets, high cash flows, and hidden reserves. The goal of activists is to serve as catalysts, setting free blocked value in a company to generate additional value for all shareholders. Activists may (1) use the media to increase public awareness about the undervaluation, (2) propose company restructuring plans at the yearly shareholder meeting, or (3) review company strategy with the management. Depending on the approach, we distinguish between friendly and hostile transactions. Friendly transactions include private communication with the management to help determine and implement operational, financial, or political improvements. Hostile transactions can include the use of public influence, for example, management may use the public arena to harm company value. Activists often strive for changes such as (1) reducing cash or the acceptance of outside capital for dividend payments, (2) focusing the business plan on core competencies and either selling, spinning off, or shutting down unprofitable business lines, and (3) selling the entire company to a competitor. The investment objectives may be equity as well as fixed income (debt/equity swaps). The active contribution of activist hedge funds is closely related to private equity investment. Table 1 reviews some important differences between private equity, hedge funds, and activists.

Activists often have at their disposal portfolios with 20–50 names, and the largest five positions may constitute between 20 and 40% of net asset value. Activists are relatively illiquid in hedge funds, because they often require a lock-up period of at least 12 months. In the United States, all investors owning more than 5% of the shares of an exchange-traded company must sign a disclosure document (Schedule 13D), which must be presented to the Securities and Exchange Commission (SEC), no later than 10 days after breaking the 5% barrier. The investors must also provide plausible explanations for the purchase of these shares. According to Brav et al. (2006), these reasons range from the least aggressive to the most aggressive: (1) a desire to communicate regularly with management to increase shareholder value, (2) a desire to obtain board representation without a proxy contest or a confrontation with existing management, (3) to make formal shareholder proposals, or to publicly criticize the company and demand changes, (4) to wage a proxy fight to gain board representation, (5) to wage a proxy fight to replace the board, (6) to bring legal actions against the company, and (7) to assume full control

TABLE 1

Distinguishing Criteria for Private Equity, Hedge Funds, and Activists

	Private Equity	Hedge Funds	Activists
Active contribution to investment	Yes	No	Yes
Time for investment decisions	3–6 months	Quick	Quick
Liquidity	Low	High	Medium
Investment criterion	Exit price	Market price	Exit price
Level of participation	>50%	Basis: daily traded volume	5–20% of voting rights
Amount of participation	Fixed	Very flexible	Very flexible
Outside capital	Yes, but rarely	Yes, often	Yes, but rarely
Hedging	No	Yes	Yes
Common interest with management	Yes	No	Yes
Exit strategy	IPO/M&A	Public market	M&A/public market
Time to exit	About 6 months	Quick	Quick if necessary
Long-term return	10–20%	10–20%	20–40%
Investment targets	Not exchange-traded	Not exchange-traded	Exchange-traded

of the company. Klein and Zur (2006) show that activists succeed in getting management to meet their demands more than 60% of the time (e.g., they obtain board representation, they effect a change in strategic operations, they effect share repurchases, or they succeed in halting merger proposals and/or buyouts or acquisitions). For the time period of 2004–2005, Brav et al. (2006) showed that the announcement of hedge fund activism generated statistically significant abnormal returns in the range of 5–7% for a 20-day window. However, Mietzner and Schweizer (2008) find evidence in the German market, that the long-term wealth effects created by private equity investors are significantly higher than those of hedge fund activists.

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Aftermarket

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The aftermarket is the market that develops following an initial public offering (IPO). While it might be expected that this aftermarket which functions similarly to that which determines the initial pricing of an IPO, there are various factors that come into play once the IPO begins trading. For instance, while the initial price for the IPO depends highly

on the IPO's prospectus, the balance between supply and demand only becomes apparent in the aftermarket, which can be manipulated. There has been a growing level of litigation over such manipulations of aftermarket orders, and the U.S. Securities and Exchange Commission (SEC) has been attempting to expand their oversight of aftermarket activities through the courts and through expansion of regulations. Most notable is the creation of demand in an informal secondary market that can cause prices to rise in the primary market for the IPO. Because such secondary markets are informal, they are often beyond the reach, but arguably within the scope, of regulatory authorities.

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Aftermarket Orders

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An aftermarket order is a term most commonly used in conjunction with the listing of an initial public offering (IPO). Dealers and investment bankers specializing in a certain IPO can create a latent demand in an aftermarket that can be fulfilled once the IPO begins trade. Some of the shares of the IPO may be locked in before trading begins. As a consequence, once the IPO lists, a seller's market is often created. This seller's market is sometimes exacerbated by carefully timed demand for the security arising from th ese aftermarket orders. The exercising of these orders can create greater attention and interest on the market, and drive the IPO up still further.

Because there is often a dearth of new information on an IPO, the market could read the interest generated through aftermarket orders and the subsequent bandwagon effect to indicate as yet unrevealed positive information about the newly listed security. As a consequence, the U.S. Justice Department and the Securities and Exchange Commission suspects that aftermarket orders have been used as a tool for market manipulation.

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Aftermarket Performance

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Ross et al. (2008) define the aftermarket as the period of time after a new issue (i.e., IPO)

is initially sold to the public. Thus, aftermarket performance refers to the gain or loss associated with a security, subsequent to its issuance. The aftermarket can typically be viewed in three distinct phases. First, the initial return, or underpricing, refers to the aftermarket performance on the first day a security trades. This return varies over time with the general level of the market, but Loughran and Ritter (2005) find an average level for recent years is approximately 15%, although during the Internet bubble of 1998–1999, average underpricing was over 65%.

The second phase of aftermarket performance concentrates on the period of time when the lead underwriter would actively trade in the market to support the price of an issue. This activity, which usually occurs for approximately 30 days after issuance, provides stability to the price of the security but may artificially inflate the true value of the asset.

The last period of aftermarket performance refers to the longer term, which will be many months or years from the initial offering. Whereas early aftermarket performance is positive, Ritter (1991) finds the longer term performance of equity issues is not as strong, with the majority of IPOs underperforming their previously existing counterparts. Much of this difference may be attributed to the overreaction of investors to the initial offering. Thus, high underpricing is strongly correlated to weak long-term performance.

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Agency Problem

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Agency problems arise when there is a conflict of interest between a *principal* and an *agent* hired having different objectives. Conflicts of interest of the principal–agent type are very common. Conflicts between the shareholders and the managers of a firm, or between the government procurement agencies and contracting firms are two such examples. The principal–agent problem typically arises when there are *asymmetries of information* between the two parties before or after the contract is signed. The literature has distinguished between two types of informational asymmetries that can arise in a principal–agent setting—those resulting from *hidden actions* and those resulting from *hidden information*. The hidden actions case is also referred to as the moral hazard and refers to a situation where the principal-owner cannot observe the actions of the agent-manager. For example, after the owner of a firm hires a manager, the owner may not be able to observe how much effort the manager puts into the job. In the hidden information case, even if the owner can observe the manager's effort, the manager may still have better information about the underlying productive environment. The basic principal–agent problem was initially studied by Ross (1973). Others, such as Mirrlees (1976), Spence and Zeckhauser

(1971), and Grossman and Hart (1983), have also contributed to this literature.

Hidden Actions (Moral Hazard)

The typical moral hazard problem has two players, the principal and the agent. To illustrate the basic moral hazard problem, assume the principal is the owner of the firm who wishes to hire the agent as the manager of a project. The gross profits excluding any wage payments to the manager are a random variable π, with probability density function $f(\pi|e)$, and cumulative density function $F(\pi|e)$, which depend on the agent's actions $e \in [\underline{e}, \bar{e}]$. The agent's actions or the managerial effort e cannot be observed by the principal and cannot be deducible from the observation of π. The agency problem arises because there is a conflict between the interests of the principal-owner and those of the agent-manager. On the one hand, higher effort is costlier for the agent and the cost function is $c(e)$, $c' > 0$. On the other hand, higher managerial effort increases the probability of higher profits for the principal, that is, the first-order stochastic dominance property holds: $F(\pi|e) \geq F(\pi|e')$, $\forall e > e'$, $\forall \pi$. The manager's utility function is $u(w, e)$, where w is the manager's compensation or wage. The problem for the principal is to choose a compensation scheme $w(\pi)$ for the manager, which depends on the observable profits, π. A common assumption in the literature is that the agent's preferences are additively separable: $u(w(\pi), e) = u(w(\pi)) - c(e)$. The optimal contract or compensation scheme to implement effort level e solves the principal's optimization problem:

$$\max_{w(\pi)} \int v(\pi - w(\pi)) f(\pi|e) d\pi, \qquad (1)$$

subject to

$$\int u(w(\pi)) f(\pi|e) d\pi - c(e) \geq \bar{u}, \qquad (2)$$

$$e = \arg\max \int u(w(\pi)) f(\pi|e) d\pi - c(e), \qquad (3)$$

where $v(\cdot)$ is the principal's utility function and $\bar{u}$ is the manager's reservation utility. Constraint (2) is the manager's *participation constraint* and requires that the owner offer such a contract to provide the manager with a level of utility of at least $\bar{u}$. Constraint (3) is the manager's *incentive compatibility constraint* and requires that under the contract $w(\pi)$, the manager choose the optimal effort, e. The principal's optimization problem can be solved using the first-order approach, that is, by replacing constraint (3) by the manager's first-order condition for e:

$$\int u(w(\pi)) f_e(\pi|e) d\pi - c'(e) = 0 \qquad (4)$$

It can easily be shown that the optimal contract satisfies the first-order condition:

$$\frac{v'(\pi - w(\pi))}{u'(w(\pi))} = \lambda + \phi \qquad (5)$$

where λ and μ are the Lagrange multipliers associated with the participation constraint and the incentive constraint, respectively, and $\phi = [f_e/f]$ is the likelihood ratio. Total differentiation of the first-order condition gives:

$$w_\pi = \frac{1}{R^A + R^P} \left[R^P + \frac{\mu \phi_\pi}{\lambda + \mu \phi} \right], \qquad (6)$$

where $R^A = -u''/u'$ and $R^P = -v''/v'$ are the coefficients of absolute risk aversion for the agent and the principal, respectively.

Assuming the monotone likelihood ratio condition holds, that is, $\phi_\pi > 0$, ensures that the optimal compensation is increasing in π.

It is straightforward to show that the second-order condition holds, that is, the manager's objective function, $u(e) = \int u(w(\pi)) \times f(\pi|e)d\pi - c(e)$, is concave and, thus, the first-order approach is legitimate.

Hidden Information

In many principal–agent problems the agent has better information than the principal about the realization of some random variable that affects the profitability of the project. These informational asymmetries can appear either before or after the contract is signed.

Although the same techniques can be employed in both cases, here we choose to focus on the case where informational asymmetries are prior to signing the contract. To illustrate, we employ a monopolistic screening model, where the principal-owner cannot observe the productivity levels of the agents managers. The principal offers a menu of contracts to screen informed agents.

To see this, assume there are two types of workers who differ in their productivity. The productivities of the two types are denoted by $\theta \in \{\theta_L, \theta_H\}$, with $\theta_H > \theta_L > 0$. The owner of the firm cannot observe the worker's productivity but knows that a fraction λ of workers are of type *H*. A worker of type θ has utility $u(w, e, \theta)$, which depends on the wage and the worker's education level, *e*. The selection of an optimal contract can be greatly simplified by invoking the revelation principle which says that the principal can restrict himself or herself to using a revelation mechanism for which the agent always responds truthfully. A revelation mechanism is a contract that asks the agent to announce his or her type and associates a payoff with each announcement. The revelation principle allows to restrict attention to incentive-compatible revelation mechanisms. Assuming the firm's production function is $f(e, \theta)$, the principal's problem is to offer a set of contracts to maximize profits and induce workers to self-select among these contracts:

$$\max_{w_H, w_L, e_H, e_L} \lambda\Big[f(e_H, \theta_H) - w_H\Big] + (1-\lambda)\Big[f(e_L, \theta_L) - w_L\Big], \quad (7)$$

subject to

$$u(w_H, e_H, \theta_H) \geq \bar{u}_H, \quad (8)$$

$$u(w_L, e_L, \theta_L) \geq \bar{u}_L, \quad (9)$$

$$u(w_H, e_H, \theta_H) \geq u(w_L, e_L, \theta_H), \quad (10)$$

$$u(w_L, e_L, \theta_L) \geq u(w_H, e_H, \theta_L). \quad (11)$$

Constraints (8) and (9) are the *individual rationality constraints* for the risk-averse worker. For a type θ_i worker to accept the contract, he must be guaranteed his reservation utility, $\bar{u}_i$, for i = H, L. Constraints (10) and (11) are the *incentive-compatibility* (or the *truth-telling* or *self-selection*) *constraints*. These constraints require that a type θ_i worker do not have incentives to mimic a type θ_j worker, for $i \neq j$.

Assuming the single-crossing property holds, that is, indifference curves in the (e, w)-space for the two types of workers cross only once, it can easily be shown that the optimal contract is characterized by the following:

$$\mathrm{MRS}_{ew}^{H} = f_e^{H}, \quad (12)$$

$$\mathrm{MRS}_{ew}^{L} < f_e^{L}, \quad (13)$$

$$w_H > w_L, \quad (14)$$

where MRS^{i}_{ew} is the marginal rate of substitution between e and w for a type $i \in \{H, L\}$ worker. Under the optimal contract with hidden information, the owner elicits the first-best effort level from a type θ_H worker. However, the effort level provided by a type θ_L worker is distorted downward from its first-best level.

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Aggregation

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In the context of managed futures, aggregation can be defined as the policy under which all futures positions owned or controlled by one trader or group of traders are combined to determine reporting status and speculative limit compliance. Speculative limits are imposed to protect futures markets from excessive speculation that could cause unreasonable or unwarranted price fluctuations. Indeed, a trader who owns too many futures contracts may destabilize the markets (e.g., the crash of October 1987). This is the reason why the Commodity Exchange Act (CEA) in the United States authorized the Commodity Futures Trading Commission (CFTC) to impose limits on the size of speculative positions in futures markets. To aggregate his/her position, an investor must also consider his/her partnership in funds. For instance, each participant with an interest of 10% or more in a partnership account must aggregate the entire position of the partnership, not just his fractional share. Note that acceptable speculative limits levels combine futures and options on a delta-adjusted basis. For instance, the Montreal Stock Exchange has the following aggregation rule for the option on the 3-month Canadian banker's acceptance. For the purpose of calculating the reporting limit, position in the option contracts are aggregated with positions in the underlying futures contract. For aggregation purposes, the futures equivalent of one in-the-money option contract is one futures contract and the futures equivalent of one at-the-money or out-of-the-money option contract is half a futures contract. Sharpe and Alexander (1990) expose the rules of aggregation in their book and show how the multiple transactions of an investor are aggregated in one account to see if the account is undermargined, restricted, or overmargined. According to these authors, aggregation is straightforward in the case of multiple margin purchases. The following formula is then used to calculate the actual margin: actual margin = (market value of assets − loan)/market value of assets. In the same manner, the actual margin of an investor who has sold short more than one stock may be easily computed: actual margin = (market value of assets − loan)/loan. However, according to

Sharpe and Alexander, things become more complicated when the investor has both bought and shorted stocks. The account can then be analyzed in terms of the dollar amount of assets that are necessary for the account to meet the maintenance margin requirement.

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Agricultural Trade Option Merchant

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An agricultural trade option merchant (ATM) is a person or organization that is in the business of soliciting, offering, or entering into option transactions involving enumerated agricultural commodities such as wheat, cotton, rice, corn, or rye (i.e., commodity option) (17 CFR 3.13). Agricultural trade options are traded off-exchange, and are not conducted on the rules of an exchange but offered on an over-the-counter (OTC) market. As a result it is possible to conclude individual contracts. Generally, the commercial producers or users of agricultural commodities ask for trade options to manage the risk arising from the specific agricultural commodity. For example, a cornflakes plant owner wants to insure against an increasing corn price and negotiates a call option with the ATM, which gives him/her the right to take delivery of corn at a specified price within a specified time period (Spears, 1999).

Trade options on some agricultural commodities were prohibited until 1998. In 1936, the Congress completely interdicted the offer or sale of option contracts both on- and off-exchange in enumerated commodities under regulation because of large price movements and disruptions in the futures markets arising from speculative trading in options. These commodities included, among others, wheat, cotton, rice, and corn, whereas trade options on non-enumerated commodities, for instance, coffee, gold, and sugar, were possible. The issue of whether to eliminate the prohibition on the offer and sale of trade options on the enumerated commodities has been reconsidered by the Commodity Future Trading Commission (CFTC) several times since 1991. In 1998, final rules concerning trade options became effective. Since then agricultural trade options are regulated by the CFTC and could only be sold by a registered ATM, who has to meet several conditions, for instance, a net worth of at least $50,000 (Spears, 1999).

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Allowances

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Allowances are the discounts or premiums on the contract price if the seller delivers a different-grade commodity or delivers to a different location than the grade or location specified in the futures contract (also called differentials). Futures contracts generally give the seller the flexibility to choose the grade of the commodity and the location to deliver. In such contracts, sellers have the option to deliver the high-quality (higher than the par basis mentioned on the contract) commodity at a premium to the contract price or low-quality (lower than the par basis mentioned on the contract) commodity at a discount from the contract price.

Similarly sellers are permitted to choose alternative delivery locations at a discount or premium. Delivery at the par location provides the seller the contract price. A seller delivering the commodity at a different location gets the contract price minus a discount if the price at the par location is higher than the actual delivery location. On the other hand, if the price level is higher at the delivery point than at par location, the seller gets a premium. The futures contract specifies these discounts and premiums for delivering a nonpar commodity or delivering at a nonpar location.

Flexibility on the delivery location and grade can increase the efficiency of futures markets by reducing the market manipulation opportunities. Narrow contract specification gives the buyer certainty over what he buys but increases the likelihood of price squeezes because of shortages in the supply of a certain variety or at a certain location (Lien and Tse, 2006). Due to this reason, Chicago Board of Trade gave up narrowly defined contracts in the nineteenth century.

Allowances can significantly differ from the realized spot price differences. Allowances are established in a way such that most of the time par grade commodity (or at par location) is delivered and nonpar grade deliveries (or at nonpar delivery locations) are penalized. This is especially significant when the buyer has a strong preference over a specific variety of the commodity (par grade on the contract) or a par delivery location (par location on the contract). Such penalties shield the buyer from the risk of transactions costs due to selling nonpar grade and buying par grade commodity when the seller delivers nonpar grade. Garbade and Silber (1983) showed that indeed allowances equal to the realized spot price differences may not be socially optimal.

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Alpha

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Alpha is defined as the intercept of a linear regression that uses the returns from a

benchmark portfolio as predictive variables and the portfolio return as response variable. The calculation of the alpha is based on either a simple regression, that is, on a regression with one single predictive variable, or a multiple regression, that is, on a regression with more than one predictive variable. The goal of performing such a regression analysis is to break down the portfolio return into a systematic component that is correlated with the benchmark factors and an uncorrelated unsystematic component. For the benchmark factors, one often uses a portfolio of investable market indices. Since a passive investor can also generate the systematic component of the portfolio return by simply following a buy-and-hold strategy in the benchmark factors, alpha is commonly used as a measure to assess an active manager's mean excess return.

Formally, denoting by $r_P(t)$ the excess returns of a portfolio P in excess of the risk-free interest rate in periods $t = 1, \ldots, T$ and by $r_{F_i}(t)$ the excess returns on the benchmark factors F_i over the same periods, we often assume that the portfolio return is a linear combination of the benchmark returns:

$$r_P(t) = \alpha_P + \sum_{i=1}^{N} \beta_{F_i} r_{F_i}(t) + \varepsilon_P(t) \qquad (1)$$

The residual (or unsystematic) returns for portfolio P, say $\lambda_P(t)$, are given by the difference between the portfolio return, and the benchmark returns weighted by the factor exposures β_{F_i}, that is,

$$\lambda_P(t) = \alpha_P + \varepsilon_P(t) \qquad (2)$$

The alpha of portfolio P is then given by the average residual return, $E(\lambda_P(t)) = \alpha_P$. The sensitivities β_{F_i} and the intercept α_P are obtained from a linear regression of the historical portfolio returns on the benchmark returns.

In Figure 1, we simulate the portfolio return given two benchmark assets F_1 and F_2. The resulting portfolio returns are plotted as points in three-dimensional space spanned by the benchmark and portfolio excess returns. In A, all excess returns are zero. The linear regression determines a line through the point cloud that minimizes the quadratic distance between the regression line and the simulated points. The intercept with the horizontal line through A, that is, the horizontal distance between A and B, equals the alpha of portfolio *P*. From Figure 1 we can conclude that, in our case, the active portfolio manager has outperformed the benchmark portfolio.

Another concept related to alpha is the concept of portable alpha, also referred to as alpha transport. A portable alpha strategy starts with a portfolio that has a return representation as in Equation 1. Then, the investment manager intentionally hedges away the factor exposure using derivatives or through short selling. The portfolio becomes immune to changes in factor returns r_{F_i}. The resulting returns correspond to the residual returns in Equation 2, that is, the hedged portfolio is a pure alpha portfolio and can be added as an independent component to other portfolio structures.

Alternative Asset

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Alternative Asset refers to any nontraditional asset with prospective economic value

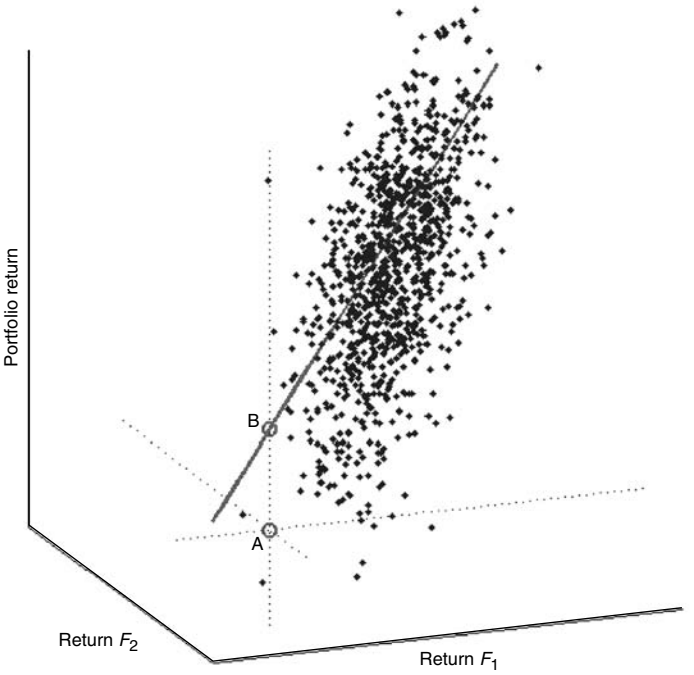

FIGURE 1
Multiple regression to determine alpha.

that cannot be found in a typical investment portfolio. As a result of the unconventional nature of some of these assets, valuation can be problematic because it is not always possible to use traditional investment valuation techniques. For this reason, investors who choose these products usually have to consider a long-term investment horizon.

The scope of this term has increased significantly over the last two decades, but alternative assets or alternative investments still have to gain complete acceptance from both institutional and private investors, and also regulators. They are regarded as speculative investments by some marginal investors, many of whom are wealthy individuals willing to take greater risks to obtain higher returns.

Nevertheless the consideration of "traditional" or "alternative" asset varies depending upon both the organization and the changes over time (Anson, 2003). For example, domestic stocks and actively managed bonds, which were thought of as alternative investments in the 1960s, however, are now part of most traditional investment portfolios. The same applies for international stocks or derivatives in the 1970s and for real estate and emerging market stocks in the 1980s. Current examples of alternative assets and investments are private equity, venture capital, commodities, precious metals, art, antiques, and hedge funds.

Hedge funds can be considered as one of the fastest-growing sectors of alternative assets (Gregoriou, 2002). They experienced tremendous growth throughout the 1990s, initially in the American markets, soon followed by markets around the world.

Today they are an important feature of all world markets; however, in European markets they remain a major source of controversy due to disagreements over methods of their regulation (Lhabitant, 2005). As a result, considerable confusion permeates European definitions over what they are, how they operate, and how they should be integrated along with traditional assets into modern portfolios.

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Alternative Asset Class

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The term "alternative asset class" is typically used to describe a group of assets that is considered nonstandard or nontraditional for an investor to include in his/her portfolio. Depending on the context, alternative asset classes include real estate, private equity, hedge funds, commodity and managed futures, currency futures, art, credit derivatives, and emerging markets equity. There is, however, no uniform definition of what constitutes an asset class. While hedge funds are typically characterized as "alternative investments," many people argue that hedge funds are not an alternative asset class themselves, although some hedge funds may give investors access to alternative asset classes (e.g., those funds engaged in managed futures). An important characteristic of alternative asset classes is that they expand the investment opportunity set and potentially improve the risk-return trade-off of an investment portfolio. This is due to the fact that, by definition, alternative asset classes exhibit relatively low correlations with traditional assets. Typically, alternative assets tend to be less liquid than traditional assets, implying that valuation may be a problem and suggesting that investors considering these alternatives should have longer investment horizons. *The Journal of Alternative Investments*, published by the CAIA Association since 1998, is specialized in publishing research in this field. Hedge funds are an important topic. For example, Agarwal and Naik (2000) present a complete analysis of the risk-return characteristics, risk exposures, and performance persistence of different number of hedge fund strategies. Liang (2004) analyzes the differences and similarities in this respect between hedge funds, funds-of-funds, and commodity trading advisors (CTAs). Ansom (2006) provides a comprehensive guide examining how alternative asset classes can be incorporated into a diversified portfolio.

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Alternative Alpha

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The term "alternative alpha" is a by-product of the alternative beta. It was originally defined by Fung and Hsieh (2003) as the difference between the total return of an alternative investment fund p and its required return, which is equal to the sum of alternative betas times the corresponding asset-based strategy (ABS) factors:

$$\alpha_{\text{Alt.}} = \bar{R}_p - \sum_{k=1}^{K} \beta_{\text{Alt.}} \overline{\text{ABS}_k}$$

Unfortunately, true alternative alphas are difficult to disentangle from "accidental alphas." The latter alphas are returns that are mistakenly attributed to the fund manager's skill. Following Fung and Hsieh (2007), accidental alpha creation is mostly attributable to missing factors and to the misspecification of time-varying alternative betas.

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Alternative Betas

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Generically, the string "alternative beta," which is a registered trademark of Alpha Swiss Group, Switzerland, refers to the nontraditional systematic risk exposures of alternative investments. These corresponding risk factors provide investors with risk premia—which reward them for the corresponding exposures—that they could not access with a portfolio of traditional assets, such as stocks, bonds, or cash instruments. Alternative risk factors are supposed to display low correlations with traditional risk factors. Thus, even though the additional returns generated by alternative betas are not pure abnormal returns like the alpha, they act as portfolio diversifiers.

Alternative betas can result from two major kinds of reasons. First, managers of hedge funds have access to investment techniques and instruments (e.g., short selling, derivatives, leverage, etc.) that are not accessible to managers of traditional funds. They can dynamically influence their investment exposures to create nonlinear, option-like payoffs. Second, managers have access to exotic investment classes that are not easily available outside the alternative investment universe, such as private equity, credit risky investments, or macroeconomic bets.

This distinction between method-based and market-based generation of alternative betas has been unified by Fung and Hsieh (2003). They show that the return-generating process of alternative investments is

essentially a linear combination of a limited number of asset-based strategy (ABS) factors, with possibly time-varying exposures. These ABS factors can be represented by trading strategies on financial markets, which can involve trading or replicating options. These factors can be exotic—thus corresponding to market-based alternative betas—and/or optional—thus corresponding to method-based betas. Only the latter should be viewed as pure alternative beta strategies, as they cannot be easily replicated through cloning procedures.

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Alternative Investment Strategies

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Alternative investment strategies refer to any investment strategy that is not based on a long-only portfolio of traditional—cash, publicly traded fixed income, or equity—instruments. This term denotes both investing in alternative assets (by purchasing traditional alternatives, such as commodities, private equity, real estate, etc.), and pursuing alternative investment strategies (such as investing in hedge funds or CTAs), thus creating risk-return profiles not accessible on conventional markets.

Alternative assets encompass, but are not limited to, assets such as private equity, private debt, real estate, commodities, venture capital, high-yield debt, foreign exchange, and interest rate products. Traditional alternatives represent, much in line with the conventional view, a simple participation on the earnings of the underlying assets.

Modern alternative investments embody asset selection strategies that focus on taking long/short positions at different markets, and may employ short selling, dynamic strategies, derivatives, as well as leverage. Investment in alternative strategies happens mainly through specialized investment vehicles such as hedge funds and managed futures.

Alternative investment strategies can be characterized by both trading strategy (directional/trend follower or nondirectional/discretionary) and market sectors (equity market segments, fixed income, emerging markets, etc.). Table 1 comprises a possible classification of investment strategies of hedge funds.

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TABLE 1

Investment Strategies of Hedge Funds

Strategy Class	Investment Strategy	Main Characteristics
Long-short equity	Long/short equity	Investing on both the long and the short side of the equity market; the total market risk position is usually not neutral
	Long-only	Like a traditional mutual fund, except that it invests in a variety of financial assets and may employ leverage
	Equity market neutral	Investing in both long and short market positions while attempting to eliminate market risk
	Dedicated short bias	Strategies that usually keep a net short market position, using both equity and derivatives
Relative value	Statistical arbitrage	Aiming at finding pricing discrepancies based on statistical data
	Relative value	Looking for undervalued investments
	Other arbitrage	Trying to explore any other mispricings
Discretionary trading	Options strategies	Strategies focusing on combined options positions
	Market timer	Trying to "time the market" by switching between more and less risky market instruments
	Short-term trading (day trading)	Any strategies focusing on short-term trading opportunities
Event-driven	Merger arbitrage	Investing in securities of companies involved in mergers or acquisitions (e.g., by selling the acquirer and buying the target)
	Distressed securities	Trading in securities of distressed or bankrupt companies
	Special situations	Opportunistic strategy focusing on anything that might drive the price of the securities
Fixed income	Convertible arbitrage	Trying to explore pricing discrepancies on the market for convertible securities
	Capital structure arbitrage	Exploring pricing inefficiencies between different classes of debt and equity of the same (or similar) companies
	Fixed income (arbitrage)	Trying to catch pricing discrepancies at the fixed income market
	Fixed income (nonarbitrage)	Investing in fixed income securities (long-short), often using leverage
Macro	Global macro (macro)	Investment strategies aiming at taking advantage of major economic trends or events such as interest or exchange rate movements
	Emerging markets (macro)	Trading in emerging market securities
Sector-based	Sector-based strategies	Focusing on a particular investment sector such as mortgage, health care, regulation, small/micro cap, technology sector, financial sector, venture capital/private equity, and so on

Angel Financing

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Angel financing plays an important role in financing seed stage ventures accounting for $6 billion compared with $330 million in venture capital in 2004 (MoneyTree Survey, 2004). Angel financing is provided by wealthy individuals who invest their own capital in a start-up company, typically at the *seed stage*, in exchange for an equity stake in the company. Venture capital and cheaper sources of capital, such as bank financing, are generally not available during seed and start-up stages of a company. Angel financing thus helps bridge the gap between the self-funded stage of a startup and venture capital. Angel investors bear a high risk since they focus on seed stage financing and expect a high return on their investment (20–30% on average) compared with more traditional investments. Angel investments are typically between $150,000 and $1.5 million.

Besides providing funding, angels often provide start-up entrepreneurs with valuable managerial advice and expertise as well as business contacts. In exchange for capital and expertise, angel investors demand a stake—common or preferred stock—in the new company with a defined exit and liquidation strategy in case of an initial public offering or acquisition, and/or convertible debt. In addition, most angel investors demand representation on the board of directors and sometimes a more active role in key decisions such as issuing additional stock at lower prices than they initially paid.

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Angel Groups

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Angel Groups, also called Angel Networks or Bands of Angels, denote organizations, funds, and networks of individual angel investors. They facilitate investment in start-up companies. Their organizational setup ranges from informal networks that serve as a mere forum to match investors and entrepreneurs to professionally managed groups of angel investors that pool their funds under a standardized investment process. Angel groups can have closed memberships, compulsory contributions, and obligatory attendance at meetings.

Angel groups allow investors to share their business experiences, leverage the diverse expertise within the group, and take a more systematic approach to their activities. By pooling their investments with other angels, they are able to raise larger capital reserves and therefore support their portfolio companies with substantial sums and also multiple tranches of financing.

Investing through a group gives the angel investor the opportunity to invest into various portfolio companies and thereby benefit from diversifying their investment risk. Typically, Angel Groups operate under some form of legal structure. The groups actively market themselves and are generally more transparent than individual angel investors who often prefer anonymity. As a

result, Angel Groups are easier to identify and reduce the search costs for entrepreneurs seeking financing. Most Angel Groups may be accessed via the Internet or organizations such as local chambers of commerce or regional development agencies.

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Angel Investor

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An angel investor refers to an individual that invests in a start-up company, typically when the company is at its inception. The term "angel investors" originated in the early 1900s, when new theatrical productions were supported by wealthy individuals. Nowadays, the angel investor, sometimes referred to as a business angel, usually invests an amount that ranges from a few thousand dollars to a few hundred thousand dollars. Angel investors are generally considered to provide funding after support from friends and family but before the company is ready to face the venture capital firms.

Many business angels are experienced entrepreneurs, retired executives, or business professionals who have some knowledge of the industry. Angel investors usually form informal networks and keep each other abreast of industry development to source for investment opportunities. They may provide valuable assistance to the start-up company, such as helping to fine-tune their business plan, introduce them to venture capital firms, or provide contacts for business opportunities.

Since angel investors invest at the beginning stage of a business, when the business has not proven its viability; the risk undertaken by them is very high, in light of the high failure rate of start-up companies. However, the rewards can be very high as well if the company is successful, because the angel investor invests at a very low valuation.

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Annualized Compound Return

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Assuming that the return on investment for period i is denoted by R_i ($i = 1, 2, \ldots, N$), the compound return (or cumulative return) over the last N periods is calculated as follows:

$$\mathrm{CR} = (1 + R_1)(1 + R_2) \ldots (1 + R_i) \ldots (1 + R_N) - 1$$

CR is simply the geometric mean of the series of past returns (Feibel, 2003; Benninga, 2006; Besley and Brigham, 2006).

An annualized compound return reflects the compound rate on an annual (yearly) basis, and is given by the following formula:

$$\text{ACR} = [(1 + R_1)(1 + R_2) \ldots (1 + R_i) \ldots (1 + R_N)]^{(1/k)} - 1$$

where k is the number of years.

The annualized compound return is simply the geometric mean of returns with respect to one year (Feibel, 2003; Benninga, 2006; Besley and Brigham, 2006). For example, if an investment of \$1000 had a return of 60% the first year and a return of −10% (a loss) the second year then the investment will grow to \$1600 the first year and then go down to \$1440 the second year. The compound multiplier is: $(1 + 0.6)(1 - 0.1) = 1.44$, which means that the compound return over the 2-year period is 44%. The annualized compound return is

$$\text{ACR} = (1.44)^{1/2} - 1 = 0.2 \text{ or ACR} = 20\%$$

Applying the ACR to the original investment of \$1000 over the 2-year period: $\$1000 \times (1 + 0.20) = \$1200$ at the end of the first year and $\$1200 \times (1 + 0.2) = \$1440$ at the end of the second year. The ACR ends up with the same cumulative return at the end of the 2-year period.

However, the average return is

$$\text{AR} = \frac{60\% - 10\%}{2} = 25\%$$

Applying the AR to the original \$1000 investment over the 2-year period: $\$1000 \times (1 + 0.25) = \$1250$ at the end of the first year and $\$1250 \times (1 + 0.25) = \$1562.5$ at the end of the second year, which is evidently not correct. This example clearly shows that the average return can be misleading and hence there is a need to use the ACR.

The annualized compound return is the constant rate of return which when applied to the initial investment over the N time periods will result in a total amount equal to the amount obtained when applying the series of returns R_i over the N time periods (Feibel, 2003; Benninga, 2006; Besley and Brigham, 2006).

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Annualized Standard Deviation

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Given a set of N time periods assume that the return on investment for period i is denoted by R_i ($i = 1, 2, \ldots, N$) and the average return by AR.

The standard deviation measures the mean dispersion of the series of return around the average return AR. It is given by the following formula:

$$\text{SD} = \sqrt{\frac{\sum_{i=1}^{N} (R_i = \bar{R})^2}{N - 1}}$$

Note that SD is the sample standard deviation, which is most commonly used as an estimate of the "true" population standard

deviation. In finance, the standard deviation is used to measure the risk of an investment. The higher the standard deviation value, the more volatile the investment returns are.

The annual standard deviation (ASD) is calculated as the standard deviation multiplied by the square root of the number of periods per year (Black, 2005; StatSoft, Inc., 2007; Besley and Brigham, 2006). The specific formula is

$$\text{ASD} = (\sqrt{k})\sqrt{\frac{\sum_{i=1}^{N}(R_i - \bar{R})^2}{N-1}}$$

where k is the number of periods per year.

The annualized standard deviation is simply a standard deviation calculated from historical periodic returns and then expressed on a yearly basis or annualized (Benninga, 2006; Feibel, 2003; Besley and Brigham, 2006). It is based on a minimum of 12 observations (12 months, 12 quarters, 12 semesters, etc.). In the world of finance, the annualized standard deviation is used to measure the volatility (risk) of an investment. Risk is an intrinsic part of any investment. A volatile investment is usually described as risky. The annualized standard deviation measures the average amount that an investment return in any single year deviated from its average return over some time period (Benninga, 2006; Feibel, 2003; Besley and Brigham, 2006). More volatile investments have high annualized standard deviations.

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Approved Delivery Facility

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Any facility that is accredited by an exchange and used as a location for the delivery of commodities underlying futures contracts is termed as an approved delivery facility. These exchange-designated facilities may be banks, warehouses, elevators, livestock exchanges, mills, plants, or other depositories where the commodities can be transferred among the parties in a futures contract. For instance, in wheat contracts at the Chicago Board of Trade, the commodity arrives at a warehouse where a warehouse official issues the holder of the short position a warehouse receipt, which is again due to be registered with the Chicago Board of Trade. The commodity is stored in the warehouse until the holder of the long position takes delivery. The chronological succession and the participators involved in the delivery process are depicted in Figure 1. Cavaletti and Holter (1996) have elaborated on this topic.

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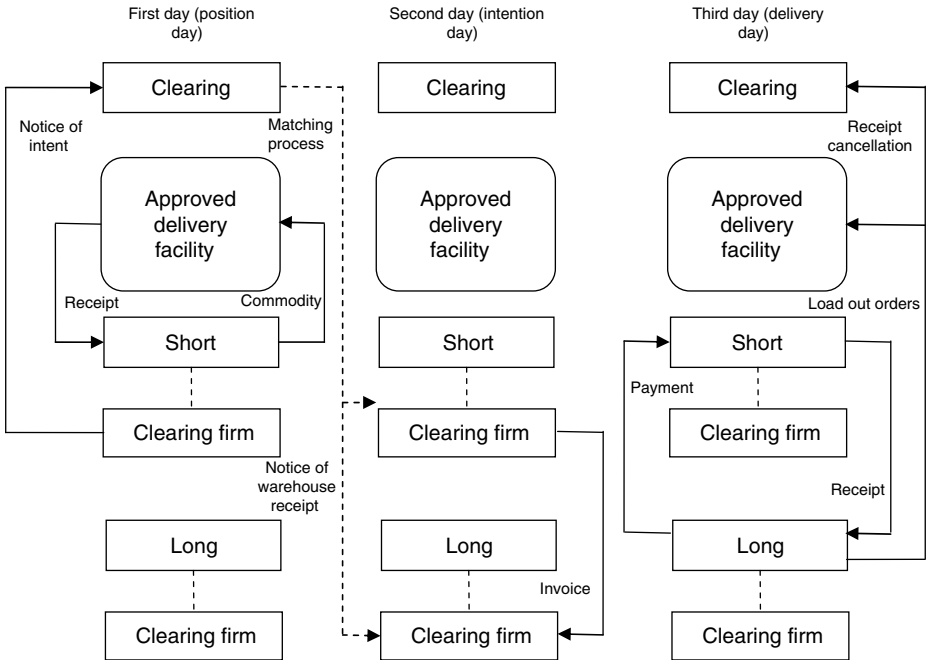

FIGURE 1
Delivery process.

Arbitrage

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Arbitrage is the trading strategy that generates risk-free profits. Arbitrage strategies are based on taking advantage of price discrepancies between identical assets traded in different markets or different assets that are somehow related. The "law of one price" states that every security generating the same cash flow must have the same price, no matter how it is created. Differences in prices generate arbitrage opportunities and informed arbitrageurs take advantage of such opportunities. They simultaneously buy at a lower price in one market to sell at a higher price earning the spread, that is, the difference between the prices. A fundamental principle of financial markets theory is that any arbitrage opportunity would be rapidly traded away so that prices would tend to move to general equilibrium. The speed of price convergence is also a measure of market efficiency. The argument of arbitrage is the basic assumption to price derivatives securities, also known as contingency claims, the prices of which are dependent on other underlying securities. Derivatives securities admit unique replicating portfolios formed of other securities. The only rational price of the derivative security is the manufacturing cost of the replicating portfolio. Nonarbitrage arguments are used to price options, forwards, futures, swaps, and other exotic derivatives. There is only one possible relationship between the underlying spot price and the price of the derivative contract written

on this underlying. If this condition is violated, an arbitrage opportunity is created, and when this opportunity is exploited, prices revert to their fair value. Three general categories of arbitrage can be identified: pure arbitrage, near arbitrage, and speculative arbitrage. In pure arbitrage, profits are totally risk-free. Pure arbitrage is possible only if identical assets are traded in different markets; there are no significant frictions, that is, transactions costs are lower than the price difference and trades are done simultaneously. These conditions are rare and mostly found in derivatives markets. In near arbitrage there is no guarantee of price convergence and there are constraints, such as transactions costs, on arbitrageurs. The fact that trades are rarely simultaneous and there is a gap between the time of placing an order and confirming a trade brings uncertainty to most arbitrage trades. Speculative arbitrage is not strictly an arbitrage because of the presence of a significant risk component, including model risk. Speculative arbitrage happens when investors take advantage of what they see, based on some asset pricing model, as mispriced similar assets. There is no guarantee of price convergence and there is the risk of price movements between the trades. Statistical arbitrage and volatility arbitrage are examples of speculative arbitrage.

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Arbitration

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Customers of a securities firm or a futures commission merchant may sometimes have a dispute with their broker. Other disputes may arise between two brokers or between professional traders. Rather than submit this dispute to costly litigation in the court system, brokers may require that their customers agree to resolve the dispute through an arbitration process. Arbitration, however, may also be voluntary for the client. Ideally, arbitration proceedings are less expensive and more expedient than litigation. The smaller the value of the dispute, the more the client would want to avoid the expense of attorneys and court.

The dispute may be related to the execution of an order or the failure to execute an order when required by market action. Either the floor broker or the clearing firm may be a party to the dispute.

Many self-regulatory organizations, such as the NASD, NYSE, and NFA, organize the arbitration process for disputes regarding their member firms; a typical arbitration panel is comprised of three members. Other disputes may be heard by a single arbitrator. Arbitrators are selected from both public and industry constituencies, and must be neutral and unbiased toward all the parties in the dispute. The client will have some choice in the selection of arbitrators, the majority of which are not members of the exchange where the dispute was initiated.

In a binding arbitration proceeding, the broker and client agree to submit to the outcome of the hearing. The arbitrator(s) will decide who is to prevail in the dispute, as well as the cost of settling the dispute. In binding arbitration, the arbitrators' decision is final and may not be appealed to the courts or a second arbitration proceeding.

Mediation is a similar, but less formal, method of resolving disputes. The two parties to the dispute hire an impartial mediator. Rather than serving the role of an arbiter whose decision is binding, the mediator simply seeks to facilitate negotiation between the parties. The mediator does not decide the outcome or the damages involved in the dispute. The parties must eventually agree on the outcome of the dispute; the mediator is simply an intermediary who facilitates those discussions.

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Archangel

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An important source of informal risk capital for entrepreneurial ventures is financing by business angels. These angel investors are wealthy individuals who invest in private start-up companies. They can be characterized by their financial/business background and investment activity as follows:

Financial and Business Background	Investment Activity	
	Low	**High**
High	Wealth maximizing angels	Entrepreneur angels
Low	Income seeking angels	Corporate angels

While some business angels invest on their own, others coinvest with other angels or institutions as a part of an angel group or a syndicate. In these situations there is often one lead investor—the archangel, who can be selected by consensus or elected by the investors. Usually, the archangel invests more than the other angel investors and is responsible for the selection of an investment opportunity. Since he mostly consults and mentors the start-up entrepreneur, the archangel should have knowledge and experience in the business field. Thus, the archangel can often be classified as an entrepreneur angel in the table above.

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Artificial Price

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Artificial price is a futures price that is distorted by the market manipulation and

deviates from the price that would reflect all the information available in a market immune to manipulation of information including the demand and the supply of the underlying commodity in the future. Specific types of manipulation include corners, squeezes as well as placing unusually large volume of purchases or sales of a futures contract to distort the demand and the supply of the futures, and/or putting out false information about the price of a futures contract. A corner is gaining effective control of underlying commodity so that the futures contract price can be manipulated. In the extreme situation, the creator of a corner can obtain contracts that require more commodities than that can be available for delivery. A squeeze is a market situation in which the lack of supply of a futures contract provided by traders who are willing to sell their existing long positions or new contracts in the market tends to force the traders who take short position in the contract to cover their short positions by offsetting at a sharply higher price than that is normal. As a result of market manipulation, an artificial price would reveal false information about future cash market prices and thus invalidate the social function of price discovery borne by a futures market. For this reason as well as others, futures exchanges as well as regulators such as the Commodity Futures Trading Commission (CFTC) closely monitor market manipulations.

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Asset Allocation

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Asset allocation is an element of the development of the portfolio management process. It is made up of two components: (i) the selection of asset classes and (ii) the estimation of weights for those asset classes.

Asset classes can be selected from two macro groups

1. Market-based (i.e., cash; bonds, such as investment grade or high yield, government or corporate, short-term, intermediate, long-term, domestic, foreign, and emerging markets; stocks, such as value or growth, large-cap versus small-cap, domestic, foreign, and emerging markets)
2. Skill-based (hedge funds; luxury collectables such as art, fine wine, and automobiles; private equity). Their risk-adjusted performance considerably depends on managers' capacity to select.

The estimation of weights is a problem that can be solved, at least in the simplest form of modern portfolio theory, in mean return standard deviation space as a choice among efficient portfolios (minimum standard deviation for any expected return). Depending on the investor's tolerance for risk, a different efficient portfolio will be selected from those in the efficient set. The form, mix, and features of the efficient frontier depend on hypotheses about the free risk asset and whether short sales are

allowed. These assumptions generate a different model for determining the efficient frontier.

The seminal paper was written by Markowitz and published in 1952. The core intuition, as he wrote at the time of receiving the Nobel award, was that "Investors diversify because they are concerned with risk as well as return. Variance came to mind as a measure of risk. The fact that portfolio variance depended on security covariances added to the plausibility of the approach. Since there were two criteria, risk and return, it was natural to assume that investors selected from the set of Pareto optimal risk-return combinations" (from Markowitz's autobiography).

After that, Sharpe proposed a model that was able to estimate the relation between securities' returns and markets' returns where they are traded on. "The CAPM is built using an approach familiar to every microeconomist. First, one assumes some sort of maximizing behavior on the part of participants in a market; then one investigates the equilibrium conditions under which such markets will clear" (from Sharpe's autobiography). Treynor et al. obtained the same relationships.

According to Michaud (1989), Markowitz' optimizers maximize errors. Since there are no correct and exact estimates of either expected returns or variances and covariances, these estimates are subject to estimation errors. To minimize the returns forecasting error, the Black–Litterman model's output is the expected returns vector, through a reverse engineering of global portfolio weights, volatilities, and correlations. The analyst establishes her relative or absolute views.

The Black–Litterman model has the benefit to merge strategic and tactical asset allocation. The former maintains a long-term goal in terms of asset mix, while the latter assesses the proportion of assets in portfolio to take benefit of market timing or stock-bond picking. Portfolio managers may implement different policies, but these can be associated to benchmarks dynamics: policies can be defined as active or passive management. Passive investment management assumes that it is very difficult to outperform the market, because it should be efficient. It is called passive, because managers do not make decisions about which securities to buy and sell. They can replicate the index by (i) holding each bond or stock in the same proportion of the index; (ii) forming a portfolio that tracks the index historically; and (iii) finding a small number of securities that matches in a defined set of factors (Elton et al., 2007). Now, with exchange-traded funds (ETFs), individual investors can buy broad sectors of the market. On the other side, active portfolios should add to market return a premium generated by the choices, which depend on managers' ability to forecast price movements. Forecasting methodologies consist of fundamental and technical approaches.

Some problems must be faced by portfolio managers in their asset allocation activity. In particular, according to Ibbotson and Kaplan (2000), portfolio styles explain: (i) portfolio returns almost completely; (ii) most of the return volatility of funds across time; and (iii) a large part of the variation or earnings across portfolios.

There is a third way combining the active and the passive styles. One well-known approach is called core-satellite, which means that most of the portfolio (core) is invested in bond or equity index funds, or ETF to minimize costs and generate the market yield, and the marginal portfolio (satellite) is invested to produce and

maximize. The satellite component can be built using alternative investments, such as hedge funds, in particular hedge and macro strategies. In this case, asset allocation benefits from the unusual correlation profiles (frequently negative with the other asset classes) and the option-like payoffs.

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Asset-Based Style Factors

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Asset-based style (ABS) factors are benchmarks derived from observed market prices, which provide direct descriptions of hedge fund strategies. It is well known that hedge fund returns vary considerably from the returns of traditional asset classes. However, as noted by Fung and Hsieh (2002) hedge fund managers and traditional managers trade in the same asset markets. This leads to the question how hedge funds deliver returns that exhibit intriguing behaviors over time. Indeed, their return characteristics often resemble those of options on the equity market. To answer this question, one must understand the underlying strategy of the hedge fund and then relate it to the traditional asset class benchmarks. What we obtain is a direct link between hedge fund returns and its styles, namely the ABS factors. These factors can be used for portfolio construction and for benchmarking hedge fund performance on a risk-adjusted basis. Furthermore, since ABS factors are constructed using market prices, one can easily obtain the return history of the style providing long-term track record for group of hedge funds. In this way, it is possible to overcome problems with the hedge fund databases, which are essentially incomplete and subject to different limitations, such as the instant-history, the selection, and the survivor-ship biases (see Fung and Hsieh, 2004).

A first notable example of how ABS factors work is in Fung and Hsieh (2001). The authors used traded options to model the attributes of trend-following hedge funds, showing that the returns from these strategies may be duplicated by a dynamically managed option-based strategy, which is typically known as a "lookback option." The trend follower is usually a trader who purchases an asset at its low and sells it at its high over a certain time frame. Because this pattern may be explained by a payout of a lookback option on that particular asset, the return of the strategy is isomorphic to the payout of the lookback option minus the option premium. Using this economic reasoning, Fung and Hsieh (2001) relied on lookback options as to ABS factors for trend-following hedge funds, capturing high degree of explanatory power for hedge funds adopting this style.

In the same way, such an approach is also useful to compute the correct manager's excess return: the alpha is estimated by comparing the returns of the hedge fund with ABS factors that describe the expected returns of a class of intricate hedge fund strategies that cannot be directly monitored. Computationally, the first step is to identify primitive trading strategies that explain hedge fund returns; then, ABS factors are created using market data to such an extent as to best capture the main characteristics of such primitive trading strategies.

Another example of ABS is in Mitchell and Pulvino (2001), where the returns of merger arbitrage hedge funds are modeled by constructing a proxy for a merger arbitrage strategy by referring to announcements over the period 1963–1998. Finally, Agarwal et al. (2005) extend the search on common risk factors among hedge fund strategies analyzing the risk and return characteristics of convertible arbitrage strategy. Fung and Hsieh (2001) identified primitive trading strategies; then using market data on Japanese and US convertible bonds, they created ABS factors that are able to capture the main characteristics of convertible arbitrage funds' strategies. ABS factors are useful tools that help inspect and model financial intermediation in over-the-counter (OTC) markets and have significant implications for risk management, portfolio construction, and benchmark planning and creating in the hedge fund industry.

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Asset-Weighted Index

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An asset weighted index, when compared to an equally weighted index, presents a clearer and more realistic view of the dollar-weighted performance of the hedge funds in the index. The first hedge fund index of this kind was the CSFB/Tremont Hedge Fund Index. However, several of the largest and well-known hedge funds may choose not to report their monthly net returns to database vendors, thereby making the examination of the returns of an asset weighted index an arduous task. "An asset weighted index is susceptible to disproportionate representation from large funds that have a very large gain or loss in any given time period. Additionally, an asset weighted index can be distorted by errors in reporting by larger funds" (see Schoenfeld, 2004, p. 200). Larger funds tend to have more weight in the index than smaller funds, and research has shown that smaller hedge funds have a significantly higher mortality rate than larger hedge funds (Gregoriou, 2002).

According to Fung and Hsieh (2004, p. 67), "… more than 75% of assets are concentrated in less than 25% of hedge funds. In the light of this right-skewed distribution of the

capital among funds, an equally-weighted index is inappropriate. On the other hand, a value-weighted index suffers from the fact that successful hedge funds usually close to new capital and stop reporting. Additionally, value-weighted schemes do not take the leverage used by the managers into account." Furthermore, the largest hedge funds have enough assets under management or may have reached capacity constraints, making them less interested in advertising their returns with any database vendors.

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Assignment

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Assignment may refer to two concepts in finance. First, an assignment is the action to compel the investor who is short on a futures or option contract to execute his obligation to deliver the underlying. For instance, a call writer who is assigned must deliver the underlying to the call holder or transfer an amount equivalent to the value of the underlying. A put writer who is assigned must buy the underlying at the specified strike. Assignment is done randomly by the exchange, which is the counterparty to every market transaction. Every time an American option is exercised, the writer must execute the terms of his or her contract. The risk borne by an assigned investor may thus be very high. For a call writer, the potential losses may be infinite while those of a put writer are contained by the exercise price of the option. Let us recall that the probability of exercise is given by the Black and Scholes—$N(d_2)$ in the case of a plain vanilla call and $N(-d_2)$ in the case of a plain vanilla put. To bear the risk of being assigned, the writer of an option receives a premium, which is the fair price of this option. In an efficient market, an option writer is fully compensated for the risk borne, in the sense that the premium is the risk-neutral expectation of the option payoffs at its expiration. Secondly, an assignment (Marshall and Bansal, 1992) may also mean a risk reduction technique in finance. In assignment, the holder of a position transfers both the rights and obligations associated with that position to a third party. He thus assigns his position to a third party. In doing so, the risk associated with holding that position is transferred to the acquiring party. In the insurance industry, assignment is widely used and is called reinsurance (Hull, 2006; Racicot and Théoret, 2006).

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Associated Person

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An associated person is any natural person who is associated in any of the following capacities with: (1) a futures commission merchant (FCM); (2) an introducing broker (IB); (3) a commodity pool operator (COP); (4) a commodity trading Advisor; or (5) a leverage transaction merchant, as a partner, an officer, an employee, a consultant, an agent, or a person holding a similar status or exercising similar functions (17CFR1.3(z)(3)(aa), 2007). The activities of an associated person mainly consist of (a) soliciting and accepting stock exchange orders of customers and forwarding executions to customers; (b) giving recommendations based on analysis and experiences made by the associated person or the brokerage house; (c) forwarding supplementary payment requests to customers and reversing redemption requests of the customer to the brokerage house; and (d) informing customers about their account balance, changes in initial margins, forthcoming publications, special ticker reports, and modified trading hours. The customer of a brokerage house always contacts the associated person. The success of the investment considerably depends on the qualification of the associated person and the cooperation with the contributor of capital (Fabozzi and Modigliani, 1996). The associated person has to be registered and has to act in accordance with the rules and regulations of the Commodity Futures Trading Commission (CFTC). The National Futures Association (NFA) takes on the registration functions for the CFTC (17CFR3.2(a), 2007).

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At-the-Money Option

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An at-the-money option is one for which the price of the underlying is equal to the strike price. For instance, the payoff of a call is equal to $\max(0, S_T - K)$, where S_T is the price of the underlying at maturity and K, the strike price of the option. This option is at-the-money if $S_T = K$. Its value is then zero at maturity but is greater than zero before maturity even if the option is at-the-money because we must take account of the temporal premium. Sometimes $S_T - K$ is viewed as the intrinsic value of a call but one might prefer to actualize this amount. The intrinsic value is then: $e^{-r(T-t)}(S_T - K)$, where r is the risk-free rate. At-the-money options have many particular characteristics. Let us consider the case of a plain vanilla call. First, for such an option, the delta, defined as the sensitivity of the price of the option to the underlying, is near 0.5. Secondly, the gamma of at-the-money option, that is the sensitivity of the delta of the call to the price of the underlying, is near its maximum. Furthermore, the liquidity of at-the-money options is usually low compared to out-of-the-money options, which are less

expensive and are therefore preferred for hedging strategies. Besides, the implied volatility of a call or a put on an action or a stock index is usually at its low when the option is at-the-money, the profile of the implied volatility being a skew which is at its maximum for very out-of-the-money options. For exchange rates, the profile of the implied volatility is rather a smile, the implied volatility being at its low when the option is at-the-money but being higher for out-of-the-money or in-the-money options (Hull, 2006; MacDonald, 2006; Racicot and Théoret, 2006).

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Attrition Rates

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The death rates of hedge funds can be measured by the attrition rate, which can be defined as the ratio of all funds exiting a specific database in a given year to the total number of funds at the beginning of the year. Empirical analyses from Liang (2000) and Chan et al. (2005) show an average attrition rate of 8.3% (1994–1998) and 8.8% (1994–2003), respectively, for the TASS database. The HFR database, on the contrary, shows a much lower average attrition rate of 2.7% (Liang, 2000) for a similar period. The Hennessee Group reports an average rate of 4.96% (1999–2004) (Heidorn et al., 2006). There is substantial variation across the different hedge fund categories in a specific database. Within the TASS database, convertible arbitrage funds are less likely to dissolve (5.2%), which is consistent with a low average return volatility. Managed futures funds, on the contrary, have the highest average attrition rate of 14.4% (1994–2003) along with a high average return volatility (Chan et al., 2005). A similar measure for the death rate of hedge funds is the mortality rate, which examines a period of more than 1 year (Heidorn et al., 2006).

The different values for attrition rates for similar sample periods are due to the heterogeneity of the underlying data, and point out the limitations of usage of the data. Hedge fund managers provide data on a voluntary basis. They usually try to develop a positive track record before providing their return data to a database. The incubation period for a hedge fund before its entry into the TASS database can range on average from 1 to 3 years. Managers of hedge funds that perform well are more likely to provide their results to one or more databases than managers with a poor performance (selection bias). This causes an upward bias as the full history of these funds are instantly included into the database (backfill bias). In addition, the reasons why managers discontinue to report their performance is not always known (self-reporting bias). Funds that are closed to new investors, for example, might protect a winning strategy, which in turn will cause a downward bias. On the other hand, funds that are liquidated due to bad performance will cause an upward bias (survivorship bias). Only 57% of all defunct funds from the

TASS database in June 2001 have been clearly identified as being liquidated, mostly due to low returns (Barry, 2002).

Gimbel et al. (2004) have come to the conclusion that attrition rates are on the increase for younger funds (up to 2 years) due to less attractive profit opportunities. However, they still outperform older funds as new ideas and strategies are more likely to generate superior returns.

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Average Gain (Gain Mean)

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Average gain is the arithmetic mean of periods with a positive return. To calculate it, the returns for all positive months are summed and divided by the number of months, as follows:

$$\text{Average gain (gain mean)} = \frac{\sum_{i=1}^{N} r_i}{N}$$

where r_i is the return for each positive month, and N is the number of positive months.

Average gain is most useful when combined with information about positive returns as a percentage of all returns. Combining the two provides a more complete picture of the risk-return profile of an investment. Some investors look for small positive, but consistent gains over time, such as the returns of bonds or low-risk relative value hedge funds. Others can tolerate larger swings in the value of their investments but look for periodic high positive returns, such as the returns of equities or directional hedge funds. In other words, risk-averse investors prefer strategies that have a high probability of small positive returns, while more risk-taking investors accept investments with a low probability of large positive returns. Investors may also seek to combine managers with both profiles for a diversified portfolio. Most investors, however, like consistent returns. An investor can plot the average gains against frequency of gains for all investments in his or her portfolio to understand the nature of return distributions available and combine managers so as to create a desired risk-return profile.

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Average Return

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Average return is simply the arithmetic mean of a series of past returns. It is a descriptive measure of past performance of an investment. It is also the most frequently used statistical measure, because it is easy to compute and to understand (Black, 2005; Keller and Warrack, 2003; StatSoft, Inc., 2007). Given a set of N time periods and assuming that the return on investment for period i is denoted by R_i, the average return (AR) over the last N periods is the simple arithmetic average of the series of returns. It is calculated as follows:

$$\mathrm{AR} = \frac{R_1 + R_2 + \cdots + R_i + \cdots + R_N}{N}$$

For example, if the annual returns of an investment over the last 4 years were 10, 12, 14, and 12%, respectively, then the average return of the investment over the last 4-year period is 12% and it is obtained by performing the operation (10% + 12% + 14% + 12%)/4.

In finance, average returns are used to give a general idea of how an investment has performed over time. In practice, the average return becomes the basis for predicting future performance. A financial analyst may estimate the past performance of an investment by computing the average return; then, he/she will include information he/she has about the current market conditions and that he/she thinks will influence the performance to adjust the average return, and use it as an expected return for future periods (Benninga, 2006; Feibel, 2003; Besley and Brigham, 2006). However, care has to be exercised when using average return because it can be a misleading measure as illustrated in the example in the next entry (see annualized compound return entry).

The average return gives a good indication of the investment's long-term performance. However, analysts also look at the investment's yearly returns to get a sense of the regularity of the investment's returns (Feibel, 2003).

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B

Backfilling Bias

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Backfilling bias occurs when a hedge fund with a good performance decides to report and the hedge fund manager includes the full or part of the return history to show the track record in a database. This bias is also called an instant-history bias. Hedge fund managers are not required to provide information regarding the fund's return and hence only start to report when the hedge funds have achieved a good track record. Therefore, hedge funds usually go through an incubation period—the time lag between the inception date of the fund and the date the track record is included in the database—before the hedge fund managers decide to report (Fung and Hsieh, 2000). They use the listing in the database for marketing purposes because hedge funds are not allowed to attract investors through public advertisement (Posthuma and Sluis, 2003). Backfilling of hedge fund returns causes the performance of the overall hedge fund universe to be overestimated because funds with bad return histories terminate and never report to a database vendor or the histories are not backfilled. More than 50% of the funds in the TASS database have backfilled returns for the period 1996–2002 (Posthuma and Sluis, 2003).

There are two methods to adjust the data for obtaining a backfill-free database. The first one is the indirect method where the average or median incubation period is calculated from all funds in a specific database. The return data for each fund in the database is then corrected by eliminating the average number of months or years from the beginning of the reported data. The direct method uses the information provided by the database vendor to calculate the individual incubation period for each fund and adjust the data accordingly (Posthuma and Sluis, 2003). Using information from the TASS database for the period 1994–1998, Fung and Hsieh (2000) have reported a median incubation period of approximately 1 year (343 days). The result from the indirect method is a lower mean performance of 1.4% p.a. for the TASS database. The backfill bias is therefore an estimated 1.4% p.a. Posthuma and van der Sluis (2003) used the direct method over the period 1996–2002. They also analyzed the TASS database and calculated an average length of instant histories of about 37 months, which is a longer period than that estimated by the indirect method. The reported backfill bias is about 4% p.a.

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Back Pricing

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Back pricing is a practice in which investors make commitment to investing in a hedge fund at a price to be determined by the fund later. It arises from the trading mechanisms in the hedge fund market. For buy orders, a hedge fund may adopt a subscription period (e.g., 1 month, which means the fund can be subscribed to once every month). The buy orders received within the subscription period will be honored at the end of the subscription period at a price of the net asset value of the fund, which is the value of total assets minus the value of total liabilities. For sell orders, a hedge fund may adopt a lockup period clause, which restricts new investors from redemption until the lockup period is over, or a redemption period clause, which stipulates that fund shares or units can only be redeemed at a certain frequency (e.g., monthly). For hedge funds without shares restriction, they are generally priced no more frequently than at the closing of each trading day. To compute the net asset value, which is the basis for ascertaining the prices applicable to investor subscriptions and redemptions, various techniques are used for different types of securities. For example, standard mark-to-market techniques are sufficient for equities. Commoditized pricing, including investment grade corporate, municipal, and government bond prices, is generally calculated using a computer model with little or no manual intervention. A hedge fund may hold illiquid assets and complex securities so that the prices of their assets are not immediately available due to lack of transactions. To value those securities, the fund needs to source the price information from independent brokers and market makers, or the counterparties to the specific OTC transactions. Mortgage-related products are often priced using models with analytical data and dealer quotes as inputs.

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Backwardation

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When a near-month commodity futures contract is trading at a premium to more distant contracts, we say that a futures curve is in "backwardation." We may also

say that the commodity is "backwardated." The converse is "contango." Backwardation occurs when supplies of a commodity are inadequate. Therefore, one interpretation of backwardation is that when inventories of commodities are tight, market participants are willing to pay a premium to buy the immediately deliverable commodity. Historically, the term backwardation has been strongly associated with Keynes, the economist. In 1930, Keynes published his "normal backwardation" commodity hypothesis. Keynes' hypothesis can be summarized as follows.

Commodity spot prices tend to be highly volatile because:

a. Demand is difficult to predict
b. In the short run, the supply response for most commodities is inelastic
c. Redundant inventories are prohibitively expensive to hold

This means that if there is a miscalculation in demand, only the spot commodity price can be adjusted to balance supply and demand.

With spot commodity prices subject to violent fluctuations, producers (and other inventory holders) will in effect pay speculators an insurance premium to lay off this unpredictable risk. Producers do so through the futures markets:

> [Even] if supply and demand are balanced, the spot price must exceed the forward price by the amount which the producer is ready to sacrifice in order to 'hedge' himself, i.e., to avoid the risk of price fluctuations during his production period (Keynes, 1930).

Importantly for investors, backwardation provides a signal that there is *not* an excess of commodity inventories. According to Keynes (1930), the markets abhor an excess of commodity inventories because of the enormous expense of financing them. If such excess inventories come into existence, "the price of the goods continues to fall until either consumption increases or production falls off sufficiently to absorb them." Therefore, for commodity investors, by going long commodities when scarcity is indicated by backwardation, one would be attempting to avoid being on the wrong side of the "strong forces [that] are immediately brought into play to dissipate" surplus inventories (Keynes, 1930). Seven-and-a-half decades after Keynes' writings, a number of authors, including Erb and Harvey (2006) and Feldman and Till (2006), have carried out empirical studies, which have confirmed the importance of confining one's investments in commodities to those markets that are structurally backwardated.

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Basis

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The primary economic function of commodity futures markets is to enable holders

of commodities to hedge inventories on a very large scale. Rarely does a standardized futures contract exactly match the location, grade, and quality of a commercial hedger's inventory. The difference in price between an idiosyncratic physical commodity and its highly correlated commodity futures contract is known as "the basis."

Since the dawn of commodity futures trading, there has been an unresolved controversy between what constitutes "hedging" and what constitutes "speculation." In a seminal article, Cootner (1967) argued "Hedging, unlike arbitrage, is not riskless. What it accomplishes is not the elimination of risk, but its specialization: its decomposition into its components. . . . we would expect merchants with a presumed comparative advantage in *basis speculation* (i.e., in predicting demand for stocks), to specialize in that field and to buy from others the specialty of speculation on absolute price." [Italics added.]

In other words, the motivation for much commercial hedging activity is not to reduce risk by hedging, but to speculate on sufficiently predictable changes in a particular basis relationship. Working (1953) provides a concrete example of wheat merchants who buy spot wheat and sell wheat futures contracts to exploit a predictable relationship in this basis.

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Basis Grade

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In the futures markets, one must specify in detail the exact nature of the agreement that the parties to this type of agreement establish (Hull, 1997). When the underlying asset of the futures contract is a commodity, the quality or qualities of the commodity that are acceptable must be stipulated very precisely (it is quite usual for there to be different varieties and qualities for the same commodity, and not all are going to be acceptable). In this sense, the term basis grade refers to the minimum accepted standard that a commodity must satisfy for it to be accepted as an underlying asset, and therefore able to be delivered on the delivery day (in some markets alternative qualities are accepted, adjusting the price received to the quality selected). Thus, for example, in futures contracts for ethanol on the Chicago Board of Trade, it is specified that the underlying asset must be "Denatured Fuel Ethanol as specified in The American Society for Testing and Materials standard D4806 for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel plus California standards." The objective of establishing certain minimum conditions for each commodity is to achieve uniformity in the goods that serve as underlying assets to facilitate negotiations and avoid conflicts at the time of delivery (Kleinman, 2005).

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Basis Swap

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This is a particular kind of 'floating against floating' interest rate swap (IRS). By this contract, two parties exchange a stream of variable payments computed on the same notional but at different floating interest rates, called bases (for an application to the insurance market see Doherty and Richter, 2002). As it happens for IRS, the two parties actually exchange the spread between the two interest rates.

The indexes used in the United States include bankers acceptance (BA), certificate of deposit (CD) rates, cost of funds index (COFI), commercial paper (CP), fed funds, the LIBOR, prime, and T-bill. A basis swap can be written on the following interest rates from either the same or different segments of the yield curve:

1. Swap on different segments of the yield curve: An example is the swap of 1-month LIBOR for 3-month LIBOR. In this case an agent could use such a swap for hedging against (or speculating on) the changes in the slope of the yield curve (Cusatis and Thomas, 2005).
2. Swap on the same segment of the yield curve: An example is the swap prime against LIBOR, which can be used by a bank lending at prime rate and borrowing at LIBOR. Thus, the bank is hedging against its basis risk (from where the swap takes its name); that is, the risk that assets or liabilities are denominated in basis different from that of a given benchmark (Cusatis and Thomas, 2005).

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Beauty Contest

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A beauty contest takes place as one of the first steps of an initial public offering (IPO). The company that wants to go public has to choose an investment bank for underwriting the offering. The company's executives meet with several investment banks to find out the most suitable to manage the offering as well as to provide research after the company is listed. Based on the information and list of questions given to the investment banks by

the company, each investment bank works out a pitch presenting their concept for the transaction. In the interview, the reasons for going public are discussed. The investment banks also have to evaluate the company in order to determine how much stocks can be sold. The criteria a company applies to selecting the underwriter are based on the concept presented, especially concerning the (preferably high) valuation of the company. Experience of the bank concerning the performance of former IPOs as well as the credibility of the bank's research analysts are also important criteria. Furthermore, the IPO will only be successful if the bank can provide the required placing power. Therefore, the company will often choose one lead underwriter and additional co-managers. The beauty contest facilitates the company's decision-making since the different concepts can easily be compared. From the point of view of the investment banks, developing a concept is easier because they already have the company's detailed requirements to focus on.

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Benchmark

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In general, a benchmark is something that is used as a reference for comparison purposes. In asset management, it is a yardstick to evaluate the performance of an investment or a portfolio manager. Typically, benchmarks are constructed as stocks or bond indexes (Bailey, 1992).

The fund manager's task when pursuing a passive investment strategy is to reconstruct the given benchmark as closely as possible. This behavior is called index tracking. The relevant risk measure is named the tracking error (Burmeister et al., 2005). In active portfolio management, the fund manager tries to outperform the performance of the benchmark portfolio. Several performance measures have been developed to assess the performance of a fund manager in comparison to a specific benchmark. Among these performance measures are the Treynor ratio, Jensen's alpha, and the Information ratio.

The management of a hedge fund typically faces a simple benchmark of just zero. This means that the fund management is not expected to outperform a specific index, but to earn a rate of return that is high in absolute terms.

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Beta

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The beta of a stock is a popular measure of its systematic risk, which is related to the market. We can define beta in regard to

the market model. The relation between the excess return of a stock (r_i), defined as the difference between the return of this stock and the risk-free rate, and the market risk premium (r_m) is as follows:

$$r_i = \alpha_i + \beta_i r_m + \varepsilon_i$$

where α_i is the alpha of Jensen and ε_i is the innovation term of the equation. Beta is thus given by the following formula:

$$\beta_i = \frac{\text{Cov}(r_i, r_m)}{\text{Var}(r_m)}$$

with Cov(.), the covariance and Var(.), the variance. Beta may also be defined in terms of the correlation coefficient between r_i and r_m. We then have

$$\beta_i = \rho_{im}\left(\frac{\sigma_i}{\sigma_m}\right)$$

where ρ_{im} is the correlation coefficient between r_i and r_m. An efficient portfolio has a correlation coefficient which is 1. Its beta is then the ratio of the return standard deviations, that is

$$\beta_i = \left(\frac{\sigma_i}{\sigma_m}\right)$$

Beta is a measure of systematic risk because it only accounts for the market risk. The risk related to the issuing company, which is nondiversifiable, is not taken into account by beta. This risk is incorporated in the innovation term of the market model. The benchmark that is used to compute the beta of a stock has a beta of unity (or 1) by definition. Stocks that have a beta greater than 1 are riskier than the benchmark and those stocks with a beta less than 1 are less risky than the benchmark. A stock may have a negative beta and in this case is a good hedging instrument for a portfolio because the beta of a portfolio is a weighted average of the betas of the stocks that constitute the portfolio. The beta of uncovered options is very high in relation to the usual betas of stocks, which are in a range running from 0.5 to 2.0. The relation between the beta of a call (β_c) and the beta of the underlying stock (β_s) is $\beta_c = \eta_c \beta_s$, where η_c is the call option's eta or price elasticity measured by the ratio of the percentage change of the price of the call to the percentage change of the underlying. The beta may be much higher than 1. For instance, the beta of an in-the-money call may be higher than 6. Typically for hedge funds strategies, beta is usually less than 1 because these strategies are covered by hedging activities. Case in point, for the market neutral strategy, the beta is near 0 and it is also very low for the fund of funds strategy (approximately 0.2). Moreover, the beta of short-seller funds is negative and quite high in absolute value, which is in the range of 1.25. The beta of the hedge funds also changes depending on the benchmark used. If we use a hedge fund composite index instead of the market portfolio index to compute the betas of the various strategies, the betas are higher because this benchmark is more similar to the style of the hedge fund strategies. For example, the beta of the market neutral strategy is 0.20 when using the weighted composite index of hedge funds as a benchmark and the fund of funds beta increases to 0.57. When estimating this parameter, practitioners must consider specification errors related to the correlation of the risk factors with the innovation term (Racicot and Théoret, 2007a, 2007b; Whaley, 2006).

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Bid-Ask Spread

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The bid-ask spread is the premium paid to a broker for his services. The bid is the price at which the broker is ready to buy a financial instrument and the ask is the price at which the broker is ready to sell a financial instrument. The ask is greater than the bid to compensate the broker for his intermediation services, that is, the matching of a buyer to a seller. When computing prices of financial instruments, researchers and practitioners often use the simple average of bid and ask prices. The bid-ask spread is a function of many variables and can be modeled as a log-log regression model. The model is written as follows:

$$s_{\mathrm{i}} = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$$

where s_i is the natural logarithm of the bid-ask spread divided by the price of stock i; X_{1i} is the natural logarithm of the number of the stock exchange market makers; and X_{2i} is the natural logarithm of the market capitalization (the number of stocks issued) of company i. In a log-log regression, the coefficients of the regressors are interpreted as elasticities. Following this equation, the bid-ask spread is related negatively to the number of market makers transacting in this stock. In addition, the bid-ask spread decreases when market capitalization increases, capitalization being a variable related to the breadth of the market for a stock. The bid-ask spread is subject to bounces as a result of high-frequency data and is otherwise known as the bid-ask bounce. This is due to the duality of the stock pricing process related to a low (bid) and a high (ask) price. The price of a stock may move from bid to ask, thus creating negative serial correlation in stock price series measured at high frequency and can be caused by the mean reverting process (Ornstein-Uhlenbeck process), which is a process usually followed by market returns (Campbell et al., 1997; DeFusco et al., 2007; Racicot and Théoret, 2001).

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Block Trade

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Block trade is defined as the trade of a large block of stocks (in terms of either number or value of stocks). Block trading

was introduced in the United States to prevent market perturbations caused by the trading of a large number of shares or bonds at a given time. Subsequently, it was implemented in many other countries. Block trading plays a major role in stock exchanges. In their seminal article, Kraus and Stoll (1972) analyzed the price impact of block trading. They maintained that this price impact can be due to three determinants: (1) a short-term liquidity effect, due to the search of a counterpart; (2) a substitution effect, caused by the lack of close substitutes for the traded security; and (3) an information effect (see the literature review in Frino et al., 2007). Indeed, block trading is a useful tool to gather information on the evaluation made by the largest stockholders, and on the premium they assign to these stocks.

Block trades are usually characterized by an asymmetry in price adjustments. As shown for instance by Anderson et al. (2006), prices temporarily change with block sales, and then rebound back to the level before sale. However, when block purchases are made instead of block sales, prices remain significantly higher.

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Bonds (Overview of Types)

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Generally speaking, a bond is similar to a loan. The borrower (the bond issuer) agrees to repay the principal (or par value) at a prespecified time (known as the maturity date) and to make periodic interest payments in the interim. However, unlike loans, bonds are securities because they can be traded in the marketplace. The important features of the lending agreement (e.g., the principal amount, interest rate, schedule of payments, and maturity date) are usually contained in a legal contract called the bond indenture that sets forth the obligations of the issuer and the rights of the bondholder.

Bonds are often referred to as fixed income securities because most bonds pay a fixed amount of interest semiannually. The amount of the interest payment is usually determined by applying the annual coupon rate to the par value of the bond and dividing by 2. However, floating-rate bonds pay interest based on a benchmark interest rate (e.g., LIBOR) that is adjusted periodically as specified in the bond indenture while zero-coupon bonds (ZCBs) make no interest payments. Instead, these bonds are sold at a deep discount from par value with the difference representing the interest on the bonds when the par value is paid at maturity.

Strictly speaking, bonds are long-term obligations with maturities in excess of 10 years. Similar debt securities with maturities of 1 year or less are typically referred to as bills while those with maturities between

1 and 10 years are called notes. Callable bonds allow the issuer to redeem the bond prior to maturity at a prespecified price while puttable bonds allow the bondholder to sell the bonds back to the issuer prior to maturity. Convertible bonds give the bondholder the right to convert, or trade, the bond for a prespecified number of common stock shares.

In the United States, four types of entities issue bonds: the federal government, federal agencies, state and local governments, and corporations. Bonds issued by the federal government are referred to as U.S. Treasury bills, U.S. Treasury notes, or U.S. Treasury bonds depending on the time of maturity. Treasury bills (T-bills) are issued with varying maturities of 1 year or less. T-bills do not make interest payments but are instead sold at a discount from par value. Treasury notes are issued with maturities of 2, 5, and 10 years while Treasury bonds carry maturities of 30 years. Both Treasury notes and Treasury bonds pay interest every 6 months. The interest earned on Treasury securities is exempt from taxation at the state level.

The federal government also issues savings bonds. These bonds are nonmarketable (but can be redeemed prior to maturity). Interest payment terms vary with some series having a semiannual fixed interest payment (Series EE) while others are ZCBs (Series HH and Series I). In recent years, the U.S. government began offering Treasury inflation-protected securities (TIPS), a new type of T-bond in which the par value is adjusted daily based on the consumer price index for all urban consumers (CPI-U).

Bonds are also issued by agencies of the U.S. government (Ginnie Mae, the export-import bank, and the TVA) and by privately owned, U.S. government sponsored enterprises (e.g., Fannie Mae, Freddie Mac, Sallie Mae, and the RTC). Many of these entities issue bonds to raise funds for loans to certain groups such as homeowners, students, and farmers. Bonds with maturities of less than 1 year are referred to as discount notes. An important element of this market is mortgage-backed securities (MBSs), also known as mortgage pass-throughs. MBSs are bonds backed by a pool of mortgages whose interest and principal payments are passed through to the investors. The majority of these MBSs are issued by Fannie Mae, Freddie Mac, and Ginnie Mae. MBSs issued through Ginnie Mae are guaranteed by the U.S. Treasury while those issued by Fannie Mae and Freddie Mac are only guaranteed by the agency itself. While mortgages were the first assets to be securitized in this manner, the idea quickly spread to other assets, such as credit card receivables and automobile loans. These bonds are referred to as asset-backed securities.

State and local governments and their agencies also issue bonds. These bonds are referred to as municipal bonds, or munis, and are exempt from taxation of interest at the federal level. General obligation bonds are backed by the taxation authority of the issuer while revenue bonds, which are issued to fund specific projects, are backed only by the revenue generated by the project.

In general, corporations issue three types of debt: secured debt, unsecured debt, and tax-exempt debt. Secured debt consists of mortgage- and asset-backed securities, which carry a lien on the property or assets identified in the indenture; collateral trust bonds, which carry a lien against particular securities; and equipment trust certificates, which carry a lien on assets such as airplanes or other equipment. Unsecured debt, or debentures, are backed only by the general credit of the issuer and includes both senior

debt, which has the first claim on the corporation's assets in the event of bankruptcy, and subordinated debt. Finally, in order to finance certain activities, such as hazardous waste disposal, corporations can issue debt that is exempt from federal taxation.

Most corporate debt is rated on the likelihood that the issuer will be able to honor the debt obligation. These debt ratings are an indicator of the default risk of the issue. In the United States, the two major rating agencies are Standard and Poor's (S&P) and Moody's. Under the S&P system, the top four ratings (AAA, AA, A, and BBB) are known as investment-grade ratings; lower ratings (BB, B, CCC, CC, C, and D) are known as speculative-grade ratings. Bonds in the lower categories are generally referred to as high-yield or junk bonds.

In the international bond market, domestic currency bonds are issued in a foreign country and denominated in the issuer's currency while foreign currency bonds are denominated in the currency of the intended investors. When foreign currency bonds are issued in the United States and United Kingdom, they are referred to as Yankee bonds and Bulldog bonds, respectively. Eurobonds are sold simultaneously in a number of countries and denominated in a variety of currencies.

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Bookbuilding

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To best understand bookbuilding, it is important to realize that the IPO process usually starts because the IPO firm, here illustrated by WeB-Genes, a small pharmaceutical boutique, is in need of a major infusion of cash so that they can take full market advantage of their patented genome product, Kur Y'all. The various players in the IPO launch may have vastly different strategies. The founders of WeB-Genes may want to maintain their connection with the firm, others may have exit strategies geared to their retirement plans, and some will just ride the stock to what they believe to be the NPV high point and then cash out, that is, sell their stock. However, all of these plans are contingent on the successful market performance of WeB-Genes. Usually, the only practical way for these unproven firms to garner such funding and keep their organization growing is to go public by selling stock in a capital market thereby becoming a publicly traded company. In this scenario, suppose that WeB-Genes contacts an investment banker (IB), and convinces the banker that Kur Y'all is a surefire market winner.

The IB does its homework and based on an excruciating, extensive, and expensive examination of WeB-Genes known as due diligence, the IB agrees to help WeB-Genes go public. As such, they agree to underwrite the shares that WeB-Genes is going to offer in the market. Then the IB and the management of WeB-Genes set an initial working range for the offer price, which is the price that investors will be asked to pay for the stock. The proposed price range is usually dictated by the IB who often has a "my way or the highway" attitude. And, actually the IBs are right; usually it would be the kiss-of-death for an IPO firm to be dumped by a major IB firm over a price squabble. After setting the initial price range for WeB-Genes, the road show commences. This means that the IB will shop the issue around to their clients. This is where the term bookbuilding comes from; in the past it was the "little black book" where all the preferred clients—privy in the pecking order to the latest popular IPO prospects—were written down. The IB gets feedback from their clients, who also perform due diligence study, about how many shares of WeB-Genes they want and at what price. The road show is the financial equivalent of the "dog and pony" show popularized by P.T. Barnum who wrote the book on hucksterism. To see an actual road show, the following URL has an interesting selection: http://www.retailroadshow.com/index.asp. At this stage, the IB and their regular clients are all just talking; while nothing is binding in a legal sense, the common understanding is that these bids and agreements are contracts in spirit. The IB is simply trying to get a sense of the market clearing price so that they are not stuck with any of the stocks that they have underwritten.

The road show is usually finished in a week or so and often culminates in a flurry of emails that set the final price of the shares of WeB-Genes at the launch, that is, the moment they open for trading on the exchange. Just before the launch, the shares are distributed according to the subscriptions recorded in the book. What is in it for the IB? Well, money of course, and at almost no risk. The IB takes as its cut what is called the spread. The spread seems to be the preferred terminology because IBs are not permitted to charge commissions on IPO placements in the United States. The IB spread is calculated based on the gross proceeds from the IPO and so WeB-Genes gets the net. This spread, independent of its labeling, is almost always around 7%. For example, assuming that the shares are offered at \$12 each with a 7% commission, the IB gets 84 cents per share [\$12 $\times$ 7%], which is usually labeled as follows: a selling concession of 48 cents, an underwriting fee of 19 cents, and a management fee of 17 cents (Chen and Ritter, 2000, p. 17). The last event is the launch and then WeB-Genes is a public company. They now have a significant amount of money to follow their genome dreams—perhaps less than they could have had thought, which is a topic treated in underpricing.

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Booking the Basis

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"Booking the basis" occurs in forward sales arrangements between two parties. Rather than specifying the cash price immediately, the arrangement implies an agreement about the time period in which the price will be fixed and the basis that will be added to the then-current futures quotation. For example, suppose that the agreement was effected in July, with the two parties having settled on a time horizon ending in December and furthermore agreed on a basis of $10 to be added to the current futures quotation. This means that the seller, the buyer or both (as specified in the contract) have the option to declare, for instance, in November, with a futures price of $110, that now payment should be made. The total amount would then be $120 because the basis has to be added. Note that the basis (which could also be a negative value, for further details see entry in this encyclopedia) is usually the difference between the futures price and the spot price, the latter here being $120, possibly contrary to the then-current market price, since the parties fixed the spread between futures and spot price at $10.

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Bottom-Up Investing

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Bottom-up investing targets the selection of outperforming financial assets on an individual basis (e.g., equities, bonds, money market assets, and real estate). This approach relies on the fact that outperforming companies are able to generate profits whatever the prevailing market conditions. Such a viewpoint requires identifying attractive firms with good return prospects whatever the related industry or prevailing macroeconomic environment. For this purpose, firm-specific fundamentals are cautiously considered such as market size, profitability, earnings and related growth prospects, sales, balance sheet, free cash flows, market share, and corresponding growth prospects among others (i.e., financial health and economic value). Then, a two-step analysis is undertaken to identify outperforming financial assets. The first step employs a fundamental analysis to establish a future expected asset value (i.e., fair value) for each security under consideration. The fair value is estimated while considering a set of key specific fundamentals such as the price earnings ratio (PER), growth ratio, return on equity (ROE), price-to-sales ratio, dividend yield, and price-to-book value ratio among others. The second step compares the firm(s) under consideration (i.e., securities' issuers) to equivalent firms belonging to the same sector, whatever their location in the world. Such a step allows for identifying competitive and attractive firms based on the forecasts

of relevant performance fundamentals (i.e., comparative analysis). The fulfillment of the bottom-up investing process yields finally to select the most promising assets in the light of the expected future economic setting.

Basically, asset selection depends on both the asset class under consideration (e.g., stocks) and relevant asset features within a given asset class (e.g., growth stocks or value stocks for stock picking). For instance, the performance of stock returns varies more widely across small caps than across large caps. Indeed, large caps such as blue chips exhibit returns, which evolve generally with the global market trend (e.g., along with business conditions, or equivalently, economic setting). However, small caps usually exhibit more volatile stock returns across market cycles. Therefore, depending on the expectation about future economic conditions, a bottom-up investor willing to invest in stocks will have to choose between small caps or large caps to build a future outperforming portfolio.

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Bridge Financing

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Bridge financing most generally encompasses all financing activities used to prevent potential illiquidity prior to expected cash inflows. The major risks mainly involve the possibility that such inflows cannot be realized and the borrower is therefore unable to repay. In alternative investments, bridge financing firstly refers to the later-stage investment phase prior to aspired IPO or M&A transactions, and secondly means the provision of bridge loans by venture capital firms in between imperfectly timed rounds of financing. With more intricate access to both public and private capital markets since the beginning of this decade, such bridge debt provisions have become increasingly common among venture capital-backed firms.

As an investment phase, bridge financing follows the expansion stage and is usually used to raise additional capital prior to an IPO, especially if the debt-equity ratio is yet unfavorable. Some bridge stage companies also aim at overcoming certain growth thresholds prior to alluring potential strategic investors in a trade sale. Although a growing number of venture capital partnerships specialize in financing later-stage ventures immediately prior to a potential exit, the bridge phase is nevertheless a field of activity for traditional investment banks, as investments do not tend to yield spectacular value increases.

Equity holders usually accept higher premoney valuation levels than in earlier stages. In return, they expect a much shorter time frame of capital lockup, as they aim to exit within approximately 6–12 months after an investment. The advantage for firms specializing in the bridge phase clearly lies in a comparatively short-termed commitment of capital and lower risk levels than in earlier stages. Nevertheless, investors need to be prepared for alternative scenarios in which a planned IPO is either postponed or fails entirely (Table 1).

TABLE 1

Overview and Classification of Financing Stages

Financing Stage	Early Stage		Expansion Stage	Late Stage	
	Seed	**Start-Up**	**Expansion**	**Bridge**	**LBO/MBO/MBI**
Business Stage	• Product concept • Market analysis • Fundamental development	• Corporate foundation • Ready for production • Marketing concept	• Production commencement • Market introduction • Growth financing	• Preparation of – IPO – Trade sale	• Acquisition by financial investor (LBO), current (MBO) or external (MBI) management

Source: Schefczyk (2006).

In venture capital, bridge financing is provided to portfolio companies urgently requiring liquidity before a new closing. It is supposed to "bridge" the potential gap between the depletion of the company's working capital resources and a subsequent but yet unfinished round of financing. Bridge financing can be provided by a number of sources (such as angel investors, wealthy founders, or banks), but most commonly stems from venture capital firms intending to either stay or become invested. While present investors may be interested in protecting their current stake for an additional period of time until the portfolio firm has raised more permanent funding, investors intending to participate in a future round may provide the bridge capital once an agreement on the summary of terms has been reached.

In the course of bridge financing transactions, investors most commonly issue convertible debt, which can be interpreted as a prepayment for the next round's equity issue. If investors are confident the anticipated investment will soon occur, the terms of such loans can be comparatively simple and straightforward in nature. They carry limited interest and automatically convert into the next round's share issue at the price then agreed or already agreed by all parties. However, more difficult access to new capital and more conscientious due diligence processes by investors have made these expected equity issues less foreseeable. Especially in uncertain situations where a planned financing round potentially does not take place at all, bridge financing provisions can incur substantial risks. As financing rounds are often negotiated much more carefully today, bridge investments also need to address a number of possible outcomes with more complex terms.

Interest rates on most bridge loans usually range between 5 and 10% with annual compounding. The aggregated interest is commonly not repaid in the end, but rather converted into equity together with the underlying loan amount. Maturities used to range between 9 and 12 months and loans immediately matured in cases of default, but a larger array of additional provisions have been introduced in recent years. Today, other covenants relating to the company's ongoing financial and business performance can also trigger maturity prior to bankruptcy. Further, common contractual provisions regulate automatic repayment or conversion of the bridge debt, both in the event that maturity is reached or in the case of an eventual acquisition before that date.

Bridge loans are usually converted into equity immediately in the subsequent financing round, where lenders get invested in the identical series of preferred stock issued to all other investors. While the conversion was historically priced at the same stock price third-party investors paid in the round itself, bridge lenders today often negotiate conversion discounts to compensate for the additional risk they incur beyond the agreed payment of interest. Although also optional instead of automatic conversion provisions are sometimes negotiated, potential conflicts with third-party investors in the next equity round usually force a conversion anyway and also hinder investors to make use of their conversion price discount, as they have only little interest in impeding a capital increase intended to replace their bridge investment.

Unlike only few years ago, today's bridge investments are often secured by pledges of collateral. Many investors negotiate high-order claims on part or all of the company's assets, including its intellectual property. This way, they can reach the status of a secured creditor and protect their investment in an event of bankruptcy. Venture capitalists can also contractually limit the use of investment proceeds to certain causes, thereby constraining the borrower's ability to distribute capital to other investors or finance past operations instead of current ones. Many also condition their payments on the fulfillment of certain duties by the borrower. Such conditions may include the raising of a certain minimum threshold amount of financing by third-party investors. Alternatively, the investor may require operative restructuring activities to first improve the company's chances on raising such financing and second increase the duration the bridge debt may last. Last but not the least, to improve their room for maneuver in future financing decisions, many investors negotiate the complimentary issuance of warrants on the portfolio firm's equity. These enhance the attractiveness of issuing bridge debt by increasing the lenders' options with respect to the borrower's future development. The amount of issued warrants and their underlying securities and exercise prices strongly vary across bridge financing agreements.

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Bridge Loan

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A bridge loan as a short-term loan serves to maintain a liquidity measure until an anticipated or expected cash flow is realized or

a long-term funding is secured. The loans used by investors, managers, or private persons for interim financing or gap financing are also known as caveat loans or swing loans and usually run up to 1 year or more in special cases. Private persons mainly use bridge loans for real estate financing when, for example, payment for a new house is due in 30 days, whereas payment for the old one is expected only after 90 days. Closed and open bridges are distinguished in regard to the financing of this 60-day gap. Closed bridges are related to a financing where the loan taker has already sold his old house. Since the probability of default after entering a sales contract is comparably low, loan issuers preferably offer closed-bridge financing. If the sale of the old house has not been finalized yet, we speak about open bridges. Due to the higher risk involved, the loan issuer requests more information concerning the chances of a sale in the near future and insists on a larger share of own capital from the private person in the existing house. In times of a real estate downturn, we observe the highest demand for bridge loans. In the corporate sector, bridge financing also exists in the form of stand-alone subordinated debt or a transaction involving company capital, for example, before an IPO. Hereby the investment banks, which act as an underwriter when going public, provide the necessary liquidity until first notice. For compensation they receive a package of discounted shares with the discount usually equaling the bridge loan. This represents a forward payment for the future stock placement (Brealey et al., 2006). Bridge loans are used for M&A financing, short-term growth opportunities, management or leveraged buyouts, corporate debt refinancing, recapitalizations and restructurings, or a bridge until reception of a large insurance payment. The short-term availability of bridge loans and their equally fast unwinding demand a higher interest rate, split up into the interest and an arrangement fee. The privilege that liquidity is provided on even shorter notice creates additional costs. Bridge loans partly belong to self-liquidating loans since they liquidate themselves through the cash flows, sacrificed for security.

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BTOP 50 Index

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The BTOP 50 Index seeks to represent the performance of the global managed futures industry. According to the Barclay Group, the index originators, and Asset Alliance, an investment management firm offering an investable version, the BTOP 50 Index achieves this objective by including the largest CTA managers across the major trading styles and markets. The major trading styles that the index includes are systematic, discretionary, and hybrid at approximately 50%, 25%, and 25%, respectively. Also, the index covers over 80 global markets including currencies, interest rate products, energy, stock indices, agriculture, and metals. At the beginning of each

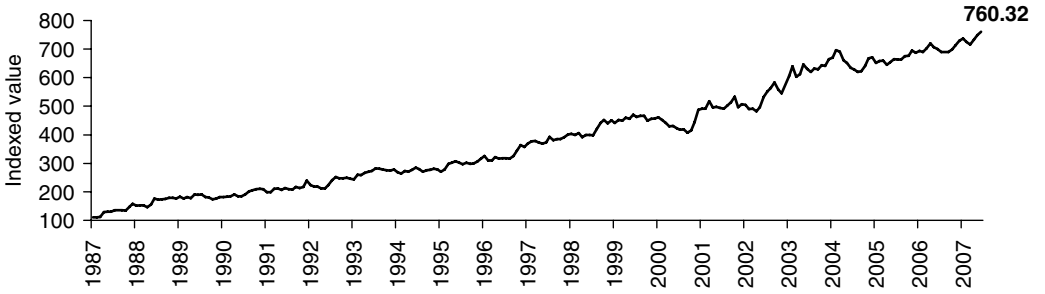

FIGURE 1
BTOP 50 Index Cumulative Performance: January 1987 to June 2007. (Retrieved from http://www.barclaygrp.com/indices/btop/ on 30th June 2007.)

year, the BTOP 50 Index equally weights about 20–30 of the largest, most well-established managers that make up at least 50% of the assets under management in the industry, as defined by the Barclay CTA Universe. The index rebalances annually and requires a reasonable level of transparency from the managers. Managers must also report daily performance estimates and offer monthly liquidity with no lockup provisions. Figure 1 depicts the cumulative performance of the index since its inception date of January 1987.

Since inception, the annualized return through June 2007 is 10.4% with an annualized standard deviation of 11.1%. The biggest drawdown, which occurred from January 2000 to September 2000, was 11.6%.

ACKNOWLEDGMENT

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Bucketing

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In the operations of financial markets, and especially in relation to the participation of individual investors, the legal protection that the regulatory bodies provide is of fundamental importance, as is the ethical behavior of the institutions responsible for mediating between the investors and the markets. In this context, bucketing is an illegal practice, in which a broker confirms an order to a client without having really carried it out. The agencies that practice this type of fraudulent operation, with the objective of making a short-term profit, are often known as bucket shops. This operation is undertaken as follows: The broker confirms the order to the client but does not carry it out at that moment, so if the future price at which he eventually does carry out the order is greater than at the moment when the client placed the order, then the client has to pay the higher price. However, if the future execution price is less than the price at the moment

the order was made, the client will pay the higher price and the difference will be kept by the broker who managed the operation. The term originates from the tradition of placing an order in a bucket as opposed to sending it to an exchange as brokers would typically do.

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Buyer's Market

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This refers to the situation in financial markets when supply exceeds demand due to the presence of more sellers than buyers. When this occurs, suppliers usually have to lower their prices, thus favoring the buyer. According to Dow theory, when successive price fluctuations reach constantly higher points, a seller's market can be identified, signaling an upward trend and a bull market. In the opposite situation, where successive fluctuations involve constantly decreasing values, we refer to a downward trend, a buyer's market or a bear market.

Dow theory establishes that market performance can be broken down into three trends: The "primary" or the "major trend" lasts for a period of at least 1 year, within which it is possible to distinguish a "secondary trend" lasting for several weeks. The direction of a secondary trend is opposite to that of the primary trend. The third type, the "minor trend," normally has a very short duration, lasting for no more than 3 weeks and moves in the same direction as the primary trend.

A buyer's market can be seen as the final phase of the three-phase bear market. During the first phase called "distribution," well-informed investors who have detected the potential development of a buyer's market situation begin to sell. Next is the "public participation" phase, in which negative news spreads throughout the market resulting in large numbers of sellers and few buyers, so prices continue to fall. During the final phase, that of "accumulation," prices fall to such an extent that they become undervalued, with the logical result of a reverse in the process. It is important to consider that these trends are directly related to volume, with volume defined as the number of transactions carried out during a period of time. In a buyer's market, the downtrend will continue as long as prices fall and volume rises.

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C

Calendar Report

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A wide range of market information is released to the public according to the calendar. For example, economic events, corporate earnings release, conference calls, and other major events such as mergers, splits, and IPO, may be scheduled to be announced at a particular time in the future. The public announcement dates can be obtained from the announcing entities such as government agencies, corporations, or public-domain web sites such as Yahoo! Finance. Regarded as having potentially substantial impact on security valuation, these announcements are reported in the financial press, for example, *The Wall Street Journal*, as they are released. They are also available at many web sites. Table 1 shows a list of scheduled economic

TABLE 1

Economic Calendar

Statistic	Release Date	Source
Auto and truck sales	First to third business day of month	Department of Commerce
Business inventories	15th of month	Department of Commerce
Construction spending	First business day of month	Department of Commerce
Consumer confidence	Last Tuesday of month	Conference Board
Consumer credit	Fifth business day of month	Federal Reserve
Consumer price index (CPI)	13th of month	Department of Labor
Durable goods orders	26th of month	Department of Commerce
Employment cost index	End of first month of quarter	Department of Labor
The employment report	First Friday of month	Department of Labor
Existing home sales	25th of month	National Association of Realtors
Factory orders	First business day of month	Department of Commerce

(*continued*)

TABLE 1 (Continued)

Statistic	Release Date	Source
Gross domestic product (GDP)	Third or fourth week of month	Department of Commerce
Housing starts and building permits	16th of month	Department of Commerce
Industrial production	15th of month	Federal Reserve
Initial claims	Thursdays	Department of Labor
International trade	20th of month	Department of Commerce
Leading indicators	First few business days of month	Conference Board
M2	Thursdays	Federal Reserve
NAPM	First business day of month	National Association of Purchasing Managers
New home sales	Last business day of month	Department of Commerce
Personal income and consumption	First business day of month	Department of Commerce
Producer price index (PPI)	11th of month	Department of Labor
Productivity and costs	7th of second month of quarter	Department of Labor
Regional manufacturing surveys	Third Thursday of month	Federal Reserve
Retail sales	13th of month	Department of Commerce
Treasury budget	Third week of month	Treasury Department
Weekly chain store sales	Tuesdays	Bank of Tokyo-Mitsubishi and LJR Redbook
Wholesale trade	Fifth business day of month	Department of Commerce

Note: Compiled from Yahoo! Finance at http://biz.yahoo.com/c/terms/terms.html

announcements. Some economic statistics are more important than others in influencing the financial markets. For each statistic, the market has certain expectation and forecast. As the theory of efficient market suggests, only the new information in the announcement will determine the market response.

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Call Option

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A call option gives its holder (buyer) the right, but not the obligation, to buy a certain quantity of an underlying asset at a fixed price (exercise price) within a predetermined time period. Options that are exercised at any time until expiration are called American style options and options that can only be exercised during a limited

period before expiration or at maturity are called European style options. It should be noted that these names have no geographical meaning; hence, this categorization is based on applicable exercise periods.

The holder of a call option is the one who obtains the right to exercise the option and the call option writer (seller) is paid the premium to provide this right to the holder. Thus, the call option writer has contractual obligation to meet the terms of the option contract if the option is exercised. The writer of a call option is obligated to sell the asset to the holder in case of exercise, regardless of the market price of the asset. The writer is not obligated to own the underlying asset that is deliverable upon exercise of the call option. Based on the possession of the asset, the writer can choose to be in three positions: (i) *covered*—already owns the asset, (ii) *spread*—owns an option that offsets some or all the risk of the option written, and (iii) *uncovered* (naked)—neither in covered nor in spread position.

The holder and the writer can take various actions. The holder of a call option can wait until the option expires, exercise the option, or sell the option at the secondary market to close out the position. The writer, on the other hand, can wait for the decision of the holder and cancel the position by buying the identical call option at the current price.

The holder and the writer differ in their expectations of the price of the underlying asset as well. The holder of a call option expects the asset prices to rise so that the option will be in the money and provide profit opportunities. That is, the holder expects to buy the asset at a lower price by exercising the option and then selling it at a higher price in the market. The writer, on the other hand, expects the security price to go down so that the option is not exercised and the premium received is retained as profit. Since the maximum loss for the holder is limited to the premium while it is unlimited for the (uncovered) writer, the risk structure of a call option is asymmetric. On the other hand, options transactions are called to be zero-sum games since the aggregate wealth of the parties involved does not change, that is, the profit (loss) of the holder equals the loss (profit) of the writer. The payoff figure for an uncovered call writer and a holder of a call option is provided in Figure 1.

The break-even point for a call option is the sum of the exercise price and the premium. The option is out-of-the-money if the exercise price is greater than the

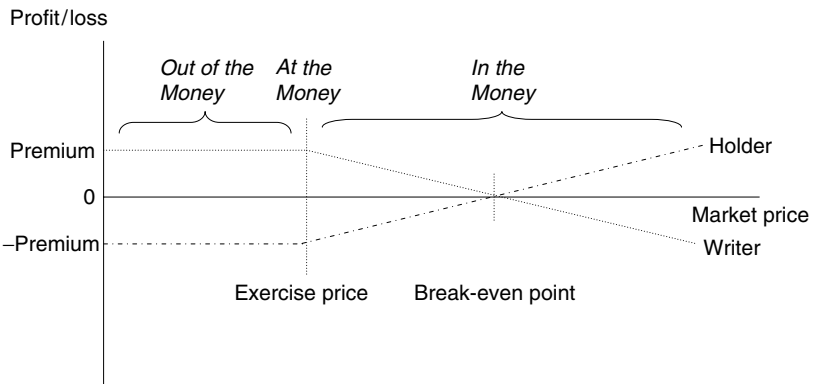

FIGURE 1
Payoff for an uncovered call writer and holder of call option.

market price and in-the-money if it is less. The option is at-the-money if the exercise price is equal to the market price. The value (price) of an option, the premium, consists of the intrinsic value and the time value. The intrinsic value is zero if the call option is out-of-the-money and positive if it is in-the-money. The intrinsic value of the call option is expressed as follows:

$$\text{Intrinsic Value} = \max[0, (\text{Market Price} - \text{Exercise Price})]$$

The value of an option is always greater than its intrinsic value. Similarly, a call option with a lower exercise price will be more expensive than the call option with the same characteristics but with a higher exercise price. The time value is also influenced by the relationship between the exercise price and the market price of the underlying asset. The options that are at-the-money have the greatest amount of time value.

The most widely used model in option pricing is the Nobel Prize winning Black–Scholes model (Black and Scholes, 1973; Merton, 1973). It is based on the possibility of constructing a risk-free hedge. The formula directly concerns call option valuation. However, a simpler way is by constructing binomial trees introduced by Cox et al. (1979). Independent of the model used for option pricing, the factors affecting option prices can be listed as the current asset price, the exercise price, time to expiration, volatility of the asset price, and the interest rate. Table 1 presents the relationship between option prices and the factors for both European and American style call options.

The motivation in being a holder or a writer of a call option varies. The holder may pursue two goals as (i) to control a larger quantity of the underlying stock by committing relatively smaller amount of funds (compared to purchasing the asset directly) and (ii) to protect a short sale. The writer, on the other hand, may pursue (i) to retain the premium in case the option is not exercised and (ii) to reduce total loss from the price decline if the writer is covered.

Most commonly known trading strategies using only call options are (i) *bull spreads*—buying a call option on an asset with a certain exercise price and selling a call option on the same asset with a higher exercise price; (ii) *bear spreads*—buying a call option on an asset with a certain exercise price and selling a call option on the same asset with a lower exercise price; (iii) *butterfly spread*—buying a call option with a low exercise price and another with relatively high exercise price, and selling

TABLE 1

Relationship between European and American Style Call Options

	European Style Call Option Price	**American Style Call Option Price**
Increase in current asset price	Increase	Increase
Increase in exercise price	Decrease	Decrease
Increase in time to expiration	Uncertain	Increase
Increase in volatility of the asset price	Increase	Increase
Increase in interest rate	Increase	Increase

Source: Adapted from Hull (2002, p. 183), Kolb (2000, p. 377).

two calls with an exercise price in between; and (iv) *condor*—buying a call with a low price, selling a call with a higher price, selling a call with a somewhat higher price, and buying a call with the highest price.

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Calmar Ratio

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Calmar ratio is one of the most popular performance criteria to assess the alternative investment opportunities in the context of hedge funds and commodity trading advisors (CTAs). The ratio is defined as the return over the maximum drawdown for a time period of $[0, t]$

$$\text{Calmar ratio} = \frac{\text{AR}}{\text{Max.DD}}$$

The mean return is represented by the compounded annual return (AR) and the risk is represented by the maximum drawdown (Max.DD). The typical investor will ask for a larger return and a smaller maximum drawdown; thereby an investment with a larger Calmar ratio is preferred. It is a common practice to set the time period to 36 months while using the Calmar ratio; however, one can use shorter time horizons in case of data unavailability.

The basic idea behind the design of such performance criteria is to penalize the mean return with the risk assumed. The Calmar ratio is similar to the Sharpe and Sterling ratios; however, the main difference among these performance criteria is the proxy used for risk. The Calmar ratio is not as popular as the other two, but is being used more frequently because it is simpler and easier to calculate than the Sharpe and Sterling ratios (Kestner, 1996). Furthermore, Young (1991) concludes that the Calmar ratio gives a more realistic view of performance results. Conversely, the Sharpe ratio has the shortcoming of not reflecting the performance correctly in case autocorrelation is present in the returns.

The Calmar ratio has numerous pitfalls the most prominent of which is ignoring the second and third greatest drawdowns. The other shortcoming is that the maximum drawdown is larger as the time period becomes longer; this characteristic of the Calmar ratio causes a lack of time-invariance. Therefore, the same time period must be used to compare Calmar ratios of alternative investment options. Theoretical contributions by Magden-Ismail and Atiya (2004) introduce the use of the expected loss in the framework of the Brownian motion to make time-invariance possible. This contribution makes Calmar ratios of different time periods comparable and enables us to compute factors to work out the relation between the Sharpe and Calmar ratios.

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Cancellation

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To buy or sell securities, investors and traders need to send an order to a broker or through an automated order management system. Market orders are designed to be executed immediately. Other orders, such as limit orders, may be eligible for execution over an extended period of time. Day orders are in force for a given trading day, while "good until canceled orders" are eligible for execution at any time before being canceled by the trader or the broker. A request to remove the order from the market is termed as "cancellation." When the price of the order is close to the market price, the order may be executed before the cancellation of the order can be confirmed. Any revision of the terms of the order, such as a change in the price or the quantity requested, requires a cancellation of the original order. This cancel-and-replace process submits a new order with the revised price and quantity information immediately upon confirmation that the original order has been canceled.

The term "cancellation" may also be applied to an executed order if it has been determined that an error was made in the filling of the order. An outtrade exists when the buyer and the seller disagree regarding the quantity and/or price of an executed order. When the quantity of the trade is adjusted to the lower of the two disputed quantities, the difference is subject to cancellation. If the broker is required to reduce the quantity of a trade, the revision is traded in the customer account, and the broker reimburses the client for any trading losses.

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Capital Call

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A capital call is synonymous with a drawdown or a takedown. It is a notification sent by the general partners to request additional capital from the limited partners. After the limited partners have agreed to commit a maximum amount of money to a private equity fund, usually, not all the capital will be needed and paid in at once. Instead, the capital is typically transferred to the general partners, or "drawn down," in several increments as investment opportunities continuously rise over time, until the full pledged amount has been reached. The drawdown or a takedown is the actual transfer of funds; the amount of capital that has been transferred to the general partners is then referred to as contributed capital. The general partners usually make several capital calls to use up the bulk of the whole commitment, often across

the course of 5–7 years. The specific timing and the size of the series of drawdowns may be planned beforehand and defined by a "takedown schedule" in the partnership agreement. In private equity, there is also a substantial entry cost. Most private equity funds require an initial investment of more than $100,000 and subsequent drawdowns in the next few years.

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Capital Commitment

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The investment in private equity (venture capital and buyout) is usually restricted to a limited number of sophisticated investors, such as institutional investors (pension funds, banks, insurance companies, university endowment funds, etc.) and wealthy private individuals or family offices. If the fund is structured as a limited partnership, the investors become limited partners with their investment. During the fundraising, they agree on providing funds (an amount of money over the life of the fund) with their capital commitment, that is, a commitment of funds in the case of an investment. For every future investment of the private equity fund, pro-rata distribution of the capital is usually provided by the limited partners, that is, according to the proportion of the capital supplied. The amount of money committed is called committed capital. In contrast, the amount of money invested is called capital invested or drawdown. Due to the fact that usually a large amount of capital is invested, there is no liquid secondary market for limited partnership stakes. Usually, a sale requires at least the consent of the general partner and, in many cases, it is not possible at all. The return on investment occurs only after a comparable long period of time. Therefore, capital commitment fulfils all criteria of a lock-in investment. Hence, the careful selection of private equity funds to invest in is an important part of the investors' capital commitment.

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Capital Distribution

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Capital distributions are the financial returns that investors in a private equity fund receive during the lifetime of the fund. They are calculated by taking the difference between the net gains (capital gains plus income) and net losses (expenses plus liabilities), and are considered at both the individual deal level and the aggregate fund level (Grabenwarter, 2005). Capital distributions are also referred to as capital inflows, since from a limited partner's perspective, they represent inflows back to the investor from a private equity fund.

The distributions may be in the form of cash, such as when a fund investment is sold or when income from ongoing operations is received. Alternatively, the inflows may also be in the form of equity as in an initial public offering (IPO). In some cases, the limited partners are able to choose how they wish to receive the proceeds from a particular deal (e.g., take cash or retain equity). Given the inherent ambiguity of any capital flows in a private equity fund, capital distributions are governed by the partnership agreement between the general and the limited partners. The agreement contains specific language on the timing, method, and frequency of distributions, and is central to measuring other key provisions of a typical partnership agreement such as the hurdle rate, clawback, and carried interest.

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Capital Structure Arbitrage

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Like the convertible arbitrage strategy, capital structure arbitrage involves trying to get advantage of the relative mispricing of securities issued by a single firm. There exists a variety of ways to implement a capital structure arbitrage. The closest strategy to convertible arbitrage is to purchase a long convertible debt and to take a short position in the high-yield debt of the same company (instead of shorting the stock as in the traditional convertible arbitrage), which neutralizes credit risk and creates a free stock option.

These kinds of opportunities may appear when either the stock or the bond market is largely overbought or oversold. Calamos (2003) examines the example of the Amazon convertible combined with the Amazon straight debt in mid-March 2000. The 4.75% convertible due in 2009 was trading at 40% of par with a yield of 19%, while the 10%-coupon debt maturing in 2008 and starting to pay a coupon in 2003 was trading at 58% of par with a yield of 15%. A strategy of going long 145 convertibles and short 100 straight bonds had a net dollar value of zero. By mid-July, the convertible traded at 54 and the straight bond traded at 66, inducing a net gain of $12,300 on the net position.

Another classical strategy of this category is the arbitrage between a firm's stock and its high-yield debt. Since 2002, as reported by Currie and Morris (2002) in a *Euromoney* report, capital structure arbitrage using credit default swaps (CDS) instead of junk debt has become very popular. The arbitrageur takes opposite positions in the firm's stock and in a credit risk protection through a CDS. This type of strategy assumes that there is a significant correlation between the stock return and the credit spread and sufficient liquidity on both the stock and the CDS markets. Chatiras and Mukherjee (2004) and Yu (2006) all find that the implementation of this strategy does not produce significant performance, on a large-scale

basis; this strategy yields Sharpe ratios similar to the traditional fixed income arbitrage strategies.

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Carried Interest

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Carried interest is the variable part of the remuneration for an investment fund's management company or individual members of the management team (general partners). General Partners of private equity funds (venture capital and buyouts) are responsible for initiating the fund, fundraising, managing relationships with the investors (limited partners), and structuring the fund. They decide on the selection and exit of investments. For those activities, the fund's management company and/or the general partners are compensated with a management fee (usually between 1 and 3% of committed capital or net asset value) as an annual fixed payment and the carried interest as a variable part of compensation. They receive the carried interest (usually about 20–25% of fund's profits) if the fund achieves a certain level of profitability that exceeds a predefined hurdle rate. One option is to distribute all net profits according to the prenegotiated compensation scheme (e.g., 20% carried interest to the general partners and 80% to limited partners). Another option is to use a model of preferential returns, for example, disappearing preferential returns. In such a model, 100% of net profits are allocated pro-rata to the limited partners until the private equity fund accomplishes the hurdle rate. Thereafter, 100% (or sometimes less) of net profits are distributed to the general partner(s) as carried interest until the prenegotiated level of 20% of all net profits is achieved. Both the management fee and the carried interest are specified in the limited partnership agreement. It is usually not renegotiated and, therefore, the compensation is prenegotiated upon the entire life of the fund.

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Carrying Charge

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Carrying charges—also referred as costs of carry—are the costs of storing a physical commodity or holding a financial instrument or currency over a period of time. In the case of physical commodities, the costs of carry include the cost of storage in warehouses, insurance against damage and financing costs, as well as other incidental costs. As most terms of futures contracts for physical commodities allow for delivery of the commodity, the carrying costs also include charges for ensuring its quality, including sampling and weighing. Futures for no storable commodities, produced on a continual basis, such as live cattle and live hogs, have no cost of carry. Full carrying charges, which represent the theoretical costs, are considered to be the cost of storage and insurance at a public warehouse and financing at the prime rate plus 1%. Financing costs, which assume that the money necessary to buy and hold the commodity is borrowed, make up the greatest portion of carrying charges. The difference between the price of the futures contract and the price of the cash commodity, which is called basis, reflects the carrying charges. Normally the far futures contracts trade at higher prices than the nearby contracts. Such a market is called carrying charge market, whereas in an inverted market the near contracts sell for more than far contracts. The last scenario arises when there is a tight supply and demand situation. For financial futures, such as futures on currencies, interest rates and stock indices, financing costs are the only carrying charges.

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Carve-Out

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A carve-out is one of the forms of "stock break up," in other words, transactions involving a company, usually a large one, which splits its stock into two or more publicly traded financial claims (Wagner, 2005). Specifically, in a carve-out the parent company sells a minority share in a subsidiary, usually through an IPO, while keeping the remaining shares in its portfolio. The subsidiary in question can be a NewCo, or a company in which the parent company has previously held shares. A carve-out transforms a firm as an organizational entity from a subsidiary to a listed firm. Consequently, the subsidiary has its own system of governance (board of directors and supervisory board) and issues its own financial reports, which are not dependent on the performance of the parent company.

In any case, the relationship between the parent company and the subsidiary continues; the latter benefits from strategic and

financial support from the former, in particular, immediately following the listing. Once this period of commingling between the two parties is over (the duration of which may vary), the parent company definitively sells its shares in the subsidiary on the stock market. Various reasons may underlie a carve-out. Supporters claim that this move can be justified as a way to motivate the management of subunits (or subsidiaries). The rationale here is that their compensation can be reckoned based on the movement of the share price of the company they are responsible for, rather than on the trend in an accounting indicator or on the performance of the parent company as a whole.

In addition, carve-outs can be seen as ways to enhance transparency for investors (Noe et al., 1998; Perotti and Rossetto, 2007), given that the subsidiaries in question provide the market with financial reports, and in any case these companies must meet the standards of transparency dictated by the stock markets. In this sense, then, a stock breakup can be useful to increase the liquidity of a share. Lastly, the reasons that are exclusively industrial can also be taken into account. In this framework, a carve-out serves to split poor-performing conglomerates into more focused business units.

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Cash Commodity

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A cash commodity describes the physical market underlying a futures contract. Cash, or spot, markets are where the underlying commodity or financial instrument trades for immediate, physical delivery. Transactions in the cash market may take place at a bank or brokerage firm for financial instruments, at a storage elevator for grains or at an oil storage facility for energy commodities.

The difference between the price in the futures market and the price in the cash market is the basis. At expiration, the price of the deliverable grade of the cash commodity must match the price of the futures contract, which means the basis is zero.

The deliverable cash commodity for each futures contract will have a very specific description. For example, the 10-year U.S. Treasury note futures at the Chicago Board of Trade (CBOT) require the delivery of any U.S. government note with between 6.5 and 10 years remaining until maturity at the beginning of the delivery month (http://www.cbot.com). The CBOT corn futures contract is based on 5000 bushels of number 2 yellow corn deliverable at grain warehouses on the Illinois River between Chicago and Pekin, Illinois. Other grades and delivery locations of corn trade at a fixed price differential to the deliverable grade.

A physical delivery contract requires the exchange of a futures contract for a position in the cash market when contracts

are held until expiration or during a time frame that allows for physical settlement. The last trading day for the CBOT 10-year U.S. Treasury note futures is the seventh business day before the last day of the delivery month, while the last delivery date is the last business day of the trading month. Any trader who has a long position at the time of the last trading day is required to purchase $100,000 face value of any deliverable US Treasury note at the futures price at any time the seller delivers the note within the delivery period. Similarly, anyone holding a long position during the delivery period for corn futures is required to purchase a warehouse receipt for 5000 bushels of corn at the futures price.

Cash settled futures do not require the physical delivery of any commodity, but require settlement in cash. Differences between the futures price and the spot market price are exchanged at the expiration date.

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Cash Market

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Futures contracts traded on organized exchanges require the future delivery of a commodity when the contract is held until expiration or into the delivery period. Cash settled contracts do not require physical delivery, but simply exchange the difference between the trade price and the settlement price upon expiration or the time of a closing trade. At the expiration of a physical delivery futures contract, the buyer is required to pay the entire contract price and the seller will deliver a quantity and quality of the underlying commodity as dictated by the exchange's contract specifications.

The price of a commodity in the futures market can differ significantly from the price of the same commodity in the cash market. The cash, or the spot, market is the variety of locations where a commodity can be purchased for immediate delivery. For grains, the cash market may be at a grain elevator. For government bonds, the cash market is at the bond dealer desk of a large bank. For energy commodities, the cash market may take place at a given pipeline location. While there is only one futures price for the same commodity at a given date, the price of commodities in the cash market may differ on any given day. Commodity prices in the cash market can differ due to transportation costs between different locations or to the variety of quality specifications of a given commodity. Financial commodities tend to have smaller price differences than physical commodities, as the storage and shipping costs of financials are much lower than that of physical commodities.

At the expiration of the futures contract, the price of the futures contract converges to the price of the specific cash market designated in the contract specifications.

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Cash Settlement

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A method of settling certain futures or options contracts whereby the market participants settle in cash rather than physically delivering the underlying asset is called cash settlement. With cash settlement, the contract trading on the underlying goods that are inconvenient on delivery can become possible (Paul, 1985). For example, if it were with physical settlement, contract on S&P index would lead to delivering a portfolio with 500 stocks. Usually, for contract settled in cash, the settlement price equals the spot price (could be the opening or the closing price) of maturity. Then the outstanding money equals the contract notional amount multiplied by the price difference between the contract price and the settlement price. Apart from that, cash settlement also can avoid the large settlement cost compared with physical form.

Because of these benefits, cash settlement can be treated as one of the most useful innovations that have occurred in the derivatives industry (Cornell, 1997). However, it is still not away from a series of debate, such as how to process the cash settlement fairly and orderly, and how to improve the price discovery function. The necessary condition for a fair cash settlement is that the settled price should converge to the spot price, otherwise market arbitrage behavior would take place.

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Cash Settlement (An Example)

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Suppose one has taken a long position in an S&P 500 futures contract with an initial futures price of 1500 USD. When the contract expires the final settlement price is, say, 1600 USD, hence the profit is 100 USD. Since it is inconvenient to deliver a portfolio of 500 stocks, the profit is realized in cash (Hull, 2006). In other cases, for example, interest rate futures such as the LIBOR futures, positions are even nonnegotiable, so that physical delivery is simply not possible. In avoiding the costs of physical delivery (imagine for instance commodity futures), the effect of cash settlement is similar to the common practice to close out the position in a timely manner.

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CDO

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The expression CDO is the acronym for collateralized debt obligation. Simply stated, CDO is a pool of bonds of different classes of risk. In the financial literature, CDO claims are divided in tranches of risk level. Typically, the tranches can be built from the observed S&P's bond market risk quotations, which are AAA, AA, A, BBB, and so on. These classes are also more finely subdivided. Other quotations might also be used like Moody's or Fitch's. CDO is a generic term for a broad class of structured products: CBO (collateralized bond obligation), CLO (collateralized loan obligation), and CMO (collateralized mortgage obligation). The broad family of CDO can be divided into two general classes: the cash CDO and the synthetic CDO. A cash CDO is a financial instrument backed by a pool of cash and debt instruments. The ownership of cash CDOs is transferred to a special purpose vehicle (SPV). A synthetic CDO confers credit exposure to the debt market by the mean of credit risk derivatives such as credit default swap (CDS). Therefore, synthetic CDOs are formed from a large pool of CDS. The cash CDO can be further subdivided in arbitrage CDO and balance sheet CDO. The same subdivision can be operated for the synthetic CDO. In the arbitrage CDO, the goal is to capture the spread between the return of the collateral assets of the CDO and the cost of borrowing. The balance sheet CDO is aimed at removing some assets from the balance sheets to make them off-balance-sheet. Finally, the arbitrage CDO can also be subdivided in cash-flow CDO and market value CDO. In a cash-flow CDO, the main cash-flows are the principal and the periodic interest payments. In the market value CDO, the return to the investors is conditional upon the total return generated by the whole portfolio. The valuation of a tranche of a CDO depends critically on the default correlation. The standard model to value the default (Hull, 2006) relies on the Gaussian copula where the probability of default is given by

$$Q(T|M) = N\left(\frac{N^{-1}[Q(T)] - \sqrt{\rho}M}{\sqrt{1-\rho}}\right)$$

where $Q(T|M)$ is the probability of defaulting at time T given a factor M normally distributed, $N(\cdot)$ is the cumulative normal distribution, and ρ is the copula. To value a tranche of the CDO, we compute the expected payoff and payments on the tranche conditional on M and then we integrate over M.

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Certification

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In an initial public offering (IPO), investors face uncertainty regarding the quality of the company going public. Only upon going public is the company required to publicly file financial statements and other items required under the Securities and Exchange Acts of 1933 and 1934. Little is known about the quality of a newly public company relative to other more established public companies. The venture capital (VC) and private equity (PE) investors in the company prior to the IPO can certify the quality of the company going public by virtue of the VC and PE investors' reputation (Gompers and Lerner, 1999). Similarly, the quality of the investment bank facilitates a certification effect for the company (Carter et al., 1997). Newly public companies that have the benefit of certification from their VC and PE investors and/or their investment bank typically have better short- and long-term IPO share price performance (Brav and Gompers, 1997; Ritter, 2003).

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Chinese Wall

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The term "Chinese wall" in the United States most likely dates to the stock crash of 1929. At that time, the U.S. government enforced an information barrier, or a wall, between investment banking and brokerage firms to avoid conflicts between objective company valuations and initial public offerings. Similarly to the real Great Wall of China this legal regulation was motivated by the desire for separation. At times, however, this segregation did not fully succeed. Examples are the conversion of superior information from banks' equity forecasts, or upward-biased reports caused by conflicts of interest.

Thus, the term "Chinese wall," when used in a business and financial context, is a metaphor that refers to a financial institution's procedures to ensure that no confidential information is transmitted between departments or teams, or leaked to the public (Calomiris and Singer, 2004). In the literature, the term "Chinese wall" is usually used to describe all types of segregation. However, we distinguish here between the "Chinese wall" and another related compartmentalization technique, the "reinforced Chinese

wall." The reinforced Chinese wall includes further restrictions such as stop lists and no-recommendation policies (MacVea, 2001).

The widespread use of Chinese walls in more modern times dates to the SEC's decision in 1968 that forced Merrill Lynch & Co. to erect a Chinese wall. At the time, Merrill Lynch was the managing underwriter of Douglas Aircraft's convertible subordinated debentures, and thus was in possession of information about the negative financial situation at Douglas Aircraft. On the basis of this shared information, several Merrill Lynch clients sold the respective stock (more than 190,000 shares were affected), and Merrill Lynch earned either transaction fees or give-up payments (for further details, see Dolgopolov, 2006). The then-common practice of give-up payments and other fixed brokerage commissions led the SEC to restrict confidential information. Although the Chinese wall is a combination of legally enforced mandatory control and commercial discretion, the discretion component may be more important (Calomiris and Singer, 2004). Investment banks nowadays often choose to systematically erect a Chinese wall because it is ultimately in their best interests, and can be a way to attract clients (MacVea, 2001).

In practice, having a Chinese wall in a company causes each department to act independently. Internal information flow is restricted according to the rules of conduct for each department, which are ensured on the basis of executive rights of the financial intermediary. However, under the "need to know" principle, which is necessary to fulfill basic departmental tasks, "wall crossing" may sometimes occur (Wiesike, 2004). In order to ensure general compliance with the Chinese wall rules, however, companies often compile a so-called insider list or watch list. This is a confidential database that contains information about all (actual and potential) relevant insider information or sensitive business situations, and their affected financial instruments, companies, and staff members. A watch list can make it possible to uncover violations of the Chinese wall at an earlier stage, thereby averting serious business problems. However, the effectiveness of a Chinese wall always rests on the loyalty and integrity of the employees, as well as the efficiency of the internal controls (for further details, see MacVea, 2001).

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CISDM Indexes

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CISDM is The Center for International Securities and Derivatives Markets, located at Isenberg School of Management at the

University of Massachusetts, USA (http://www.isenberg.umass.edu/tinopmgt/CISDM). The CISDM Index (http://cisdm.som.umass.edu/) includes a series of 15 hedge fund indices, 2 fund of funds indices, 14 CTA (commodity trading advisors) indices, and 3 CPO indices (commodity pool operators, responsible for investing commodity pools' assets in commodity, futures, options, and indices). CISDM delivers a commercial database containing 2300 hedge funds, 1700 fund of funds, 420 CPOs, and 220 CTAs (http://cisdm.som.umass.edu/resources/databasecomp.asp). The CTA and CPO returns are monthly and delivered asset weighted or equally weighted. The hedge fund index and fund of funds returns are on a monthly basis and they are computed using the median returns of all the reporting hedge funds (i.e., 2179). The median return is the return located in the position m = integer (n/2), where n is the number of monthly returns, in a series of ascending monthly returns.

Clawback

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In order to grasp the clawback principle, it is necessary to understand the hurdle rate of a fund agreement. The hurdle rate is the preferred return for the limited partners (LPs) and the general partner (GP) in the return allocation formula, which includes a catch-up provision for the GP. In a typical "hurdle deal," the return allocated to the LPs would initially be 100%, until a specified (usually 8%) return on invested capital (or commitments) is met. If the cumulative profits exceed the above-mentioned hurdle rate, a certain percentage of the returns thereafter (usually between 50 and 100%) are allocated to the GP until he/she receives his/her agreed-upon profit (usually about 20%). This premium to the GP is called the catch-up. The allocation of the profits exceeding the catch-up varies, but is usually about 80% for the LPs and 20% for the GP.

Hurdle rates are normally compounded annually. Ideally, they should be calculated from the due date of the respective drawdown notice until the date of the respective distribution. However, the calculation period can also be the actual date of investment in a portfolio company and the last month of distribution. These are contract specifications and vary from fund to fund. Hurdle rates are common for buyout funds, but unusual for venture capital funds (for a survey and numerical examples, see Metrick and Yasuda, 2007).

For protection, fund agreements typically provide that an overdistribution to the GP is "clawed back" to the fund from the GP, and then distributed to the LPs. For this purpose, so-called trigger events are defined that will cause a clawback obligation. The trigger events are common if the GP has received some carry, but the LPs have not achieved their preferred return/hurdle, or if the GP has received carry in excess of, for example, 20% of cumulative net profits over the lifetime of the fund.

The clawback obligations are secured by an escrow account. A percentage of 15–50% of any carry distribution is stored in the escrow account, and is invested in risk-free or cash-equivalent investments. This mechanism is exceptionally important for first-time funds, where creditworthiness may be unknown. In practice, the distributions

that are not secured by an escrow account are usually distributed to a special purpose vehicle (SPV) with limited liability, which is owned by the GPs. To avoid the insolvency risk associated with SPVs, the GPs guarantee the clawback obligation on a several, not a joint, basis. Thus, the maximum clawback obligation for each GP cannot exceed the aggregate amount of the carry allocation he/she has received over the fund's lifetime.

Another specific feature of clawbacks is the after-tax declaration, where the GP provides a clawback net of taxes. In this case, the clawback obligation never exceeds the total carry distribution received by the GP, less total taxes paid or payable thereon. To summarize, clawback issues arise mainly with the deal-by-deal carry, since the GP usually has received his carry early in the fund's lifetime. Furthermore, because of the guarantee on a several basis, and the after-tax declaration, the LPs bear the credit risk for the GP.

The important position of clawbacks in contract negotiations was highlighted by the Center for Private Equity and Entrepreneurship's (2004) survey on limited partnership agreements. This study found that the majority of GPs stated that clarifying the clawback obligation was one of their most important responsibilities. This is reinforced by the fact that they reported spending most of their negotiating time with the LP on this issue.

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Clearing Members

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Clearing members are member firms of clearing organizations at which futures contracts are cleared and settled. By joining the clearinghouse clearing members gain the right to clear trades for their own customers and that of nonmember brokerage firms. In futures markets traders do not interact directly with each other. Instead, clearing members assume the opposite position in each transaction. For example, if A wants to sell a commodity in futures market and B wants to buy the same commodity in futures market; A's clearing member firm buys the commodity from A. B's clearing member firm sells the commodity to B. Then clearing member firms matches buy and sell orders through the clearinghouse. In that arrangement A and B have no direct commitments to each other; but have commitments only to their clearing firms. Since each party is free to buy and sell independent of the other, this system greatly improves the liquidity and efficiency of the futures markets.

Liquidity is essential in order to fulfill economic functions of futures market. The clearing members and clearinghouses provide a setting that promotes liquidity by minimizing the transaction cost of trades and making futures contracts relatively homogenous (Bernanke, 1990). Clearinghouses and clearing members homogenize the individual contracts by guaranteeing both sides of the trade; lacking this institutional arrangement each contract would have different risk level since each individual has

different probability of default on contracts. This guarantee means that neither seller nor buyer has to be concerned with the reliability of the other party. Therefore, each contract in futures markets is interchangeable, and futures markets are much more liquid than would have been without clearing members and clearinghouses.

Default risk on futures contracts is predominantly significant due to extended time between entering the contract and the contract fulfillment date. Therefore, traders have to be monitored constantly to minimize the default risk. Modern futures markets have established hierarchical monitoring systems. Clearing organizations monitor their clearing members, clearing members monitor their customers and nonmember brokerage firms, and nonmember brokerage firms monitor their own customers. Since there is close and regular contact between the monitors and the monitored, the indications of financial distress and that of higher than normal probability of contract default are easily noticed.

Since clearinghouses are somewhat responsible for their clearing members' obligations; to minimize the risk of a contract default, they continuously monitor the financial strength of the member firms. To do that clearing organizations set capital requirements, position limits, and collect margin payments from clearing members. In futures markets, good-faith deposits (margins) are collected from both the buyers and the sellers to make sure that contract obligations are fulfilled. Clearing members collect margin from their own customers on a gross basis. The clearing members post margin with the clearinghouse, generally on a net basis (Chicago Board of Trade Staff, 2006). A clearing member whose customers held an equal member of long and short contacts would post no margin with the clearinghouse, but would retain customers' margins in its account. For example, if a clearing member firm reports to the clearinghouse purchase of X units of certain commodity and sale of Y units of the same commodity, then this member would be required to deposit equal to clearing margin on this commodity times $(X - Y)$.

Unless a significant portion of clearing member firms' customers default on their obligations, this system is able to shield individual traders from the risks inherent in the futures markets. Moreover, clearinghouses usually guarantee the contracts of their clearing members. These arrangements, which partially integrate clearing members and distribute the default risk among them, are generally successful in risk control and management; therefore, failure of clearing members has been relatively rare (Kroszner, 2000). Clearing system with clearinghouses and clearing members, which have evolved with futures markets, provides smoother and more efficient futures markets as default risk is significantly reduced and the task of determining counterparty creditability is greatly simplified.

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Clearing Organization

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Clearing is the process of ensuring that all trades are properly completed. This process requires that all trades are paid for within the specified time frame, that the buyer and the seller receive prompt confirmation of the trade, and that each position is accurately reflected in both the buyer's and the seller's accounts. Futures markets are a zero-sum game, where the losses of the losers equal the gains of the winning traders. In futures markets, all trades are marked-to-market daily, which requires that the day's losers pay their losses to the account of the winners.

Clearing brokers, or clearing members, aggregate the margin deposits of all their customers. These clearing firms ensure that each individual account maintains sufficient capital to fund their trading losses. When the assets in an account decline below the maintenance margin required by the exchange, the broker requires the trader to increase the assets in the account. Should the trader be unable to post the required margin, the clearing firm will close some or all the positions in the account to prevent further losses. Each clearing broker is financially responsible for the losses of their customers that are beyond their customers' ability to pay.

Each futures exchange is affiliated with a clearing organization or clearinghouse. The clearing organization combines the resources of all clearing brokers affiliated with the exchange. Should a single clearing broker fail due to excessive losses by their customers, the other clearing members of the exchange combine their assets at the clearinghouse to ensure the financial integrity of the futures exchange. The resources of the clearinghouse are derived from the margin and membership deposits of the clearing brokers, as well as a portion of the clearing fees paid on each contract traded at the exchange. Because all clearing firms are members of the clearinghouse, customers only need to ensure that their trades are executed on the exchange. It is not required that customers of a given clearing firm execute their trades with a customer of the same firm.

The clearinghouse facilitates the exchange of mark-to-market payments between different clearing firms. Finally, the clearinghouse is responsible for administering the delivery process at the expiration of each contract.

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Clearing Price

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The price at which the quantity demand and the quantity supplied of a particular asset or commodity is equal. For example, if corn farmers (suppliers) bring 100 metric tons of corn to market and the buyers of corn (bread and cereal companies) demand the same amount, at a price of $3.00 per bushel,

the market clears. Any price above this price will result in a surplus of corn and any price below this price will cause shortage of corn supply. The clearing price in any given market is an ongoing and dynamic process, with the equilibrium price changing due to the forces of supply and demand and sometimes government intervention.

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Closing

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The word "closing" usually applies to the conclusion of some activity or artistic work. In investments, the closing is the legal process that is the end of negotiations leading up to the purchase or sale of an asset. Josh Lerner defined a closing as "the signing of the contract by an investor or group of investors that binds them to supply a set amount of capital to a private equity fund. Often a fraction of that capital is provided at the time of the closing. A single fund may have multiple closings."

A closing may be the most common legal action most individuals experience since homeowners buy, sell, and refinance several times during their lifetimes. In contrast, many people never experience many other legal experiences (marriage, execution of a will, filing a law suit, for example).

Closings are used to exchange real estate, initiate real estate loans or corporate loans, and consummate mergers and spin-offs. Closings are not used to effect exchange-traded transactions because the terms of the transactions are highly standardized. Closings are not used with most over-the-counter derivatives, perhaps because they are frequently designed to have little or no intrinsic value at initiation. Instead, these exchanges are called settlements.

The closing of a private investment caps extended and sometimes tense negotiations over detailed provisions and wording of major and minor provisions. By the time the closing is scheduled, most of the details have been negotiated and the closing usually involves routine tasks such as signing documents and transferring money. Occasionally, problems are uncovered at a closing, but all involved parties usually work out differences or compromises. If the problems cannot be resolved quickly, the closing might be adjourned until a problem can be resolved. If differences cannot be resolved, the closing may be cancelled.

The parties buying or selling the asset may attend the closing. For routine closings, investors frequently grant the authority to their lawyers to effect the exchange for their benefit. While legal representatives of the buyer and seller attend a closing, there can be other parties if the transaction involves debt financing that commences at the time of the exchange. In some cases, the closing involves multiple buyers, multiple sellers, and multiple lenders.

For most securities, the buyer/investor pays for the investment at the time of closing or simultaneously arranges for financing. Typically, however, venture fund investors contribute only a portion of the capital at the closing and commit to additional

contributions as the venture fund begins to make investments.

Following the closing, the parties involved with the closing often have a closing dinner. A closing dinner is a celebration of the transaction where adverse parties come together to celebrate the agreement negotiated under stressful conditions between parties that are motivated to negotiate the most favorable terms. After the closing, the dinner recognizes that the negotiations have identified a set of terms where both the buyer and the seller believe they gain an advantage. The dinner celebrates those advantages and announces that the parties and their legal representatives are no longer adversaries.

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Coefficient of Determination

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This coefficient is often used to evaluate the goodness-of-fit of linear regression models. This is the "*R*-squared" that one usually encounters when running a linear regression model with a software package. Analysis-of-variance (ANOVA), as applied to linear regression, decomposes the total variability of the dependent variable (SSTO) into the variability due to the model (SSR), often called the "explained error," and the remaining variability due to pure error (SSE), often called the "unexplained error." The coefficient of determination, R^2, is defined as the proportion of total variability attributed to explained error, so that $R^2 = \text{SSR/SSTO}$. In multiple linear regression, R^2 is called the coefficient of multiple determination. It is well known that R^2 always increases when extra independent variables are added to the regression, even when those variables have little or no explanatory power. Hence, many analysts prefer the adjusted coefficient of multiple determination, R^2_{A}, which incorporates a penalty for extra variables. Contrary to R^2, R^2_{A} will decrease when extra variables have no explanatory power and may even take on negative values.

Since it measures the proportion of explained variability, R^2 is often used as a goodness-of-fit measure for evaluating and comparing models. The coefficient is subject to numerous caveats, however, and if these are ignored the coefficient can produce misleading results. Moreover, it can only be used to evaluate simple and multiple linear regression models. Usually $0 \leq R^2 \leq 1$, but it is easy to show by algebra that this holds on when the regression model contains an intercept (Greene, 2003). When other types of models are employed, such as a regression model that contains dummy variables, logistic or probit regression, or a generalized linear model, R^2 cannot be used to assess fit and other measures must be employed. In generalized linear models, for example, deviance is used to evaluate fit, and a "pseudo" R^2 has been developed for logistic regression.

Many authors have fitted linear models to hedge fund returns, with varying success. The R^2 from these models is typically low,

especially compared to R^2 from linear models of mutual fund returns. Moreover, the magnitude of R^2 is heavily dependent on the style of hedge fund for which the returns are being fitted, with some styles showing high values of R^2, and other styles, low values.

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Coffee Market

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Coffee is the highest volume primary commodity after crude oil and is traded mainly at the New York Board of Trade and the London International Financial Futures and Options Exchange. In 2005 Latin America accounted for 60% of world output while Asia and Africa accounted for 24 and 16%, respectively (Baffes et al., 2005). The two main types of coffee are (i) *Robusta*, which is especially suitable for instant and flavored coffee, and (ii) *Arabica*, which is processed to high-quality coffee and is generally sold at a higher price than the price of Robusta coffee. Figure 1 shows that coffee is a particularly volatile commodity, even compared to other agricultural products.

Coffee supply and prices can change dramatically depending on weather conditions like drought and frost. For many African and Latin American countries coffee constitutes a major share of their GDP, so that incomes in those countries change with the variability of world coffee prices. Furthermore, the supply of coffee has recently been increased by new production from Brazil and Vietnam. The entrance of Vietnam as a new large producer of Robusta coffee, as a result, has depressed coffee prices to a historical low. To keep prices above a minimum price level, several consortiums and agreements were formed in the past. The most recent ones are the International

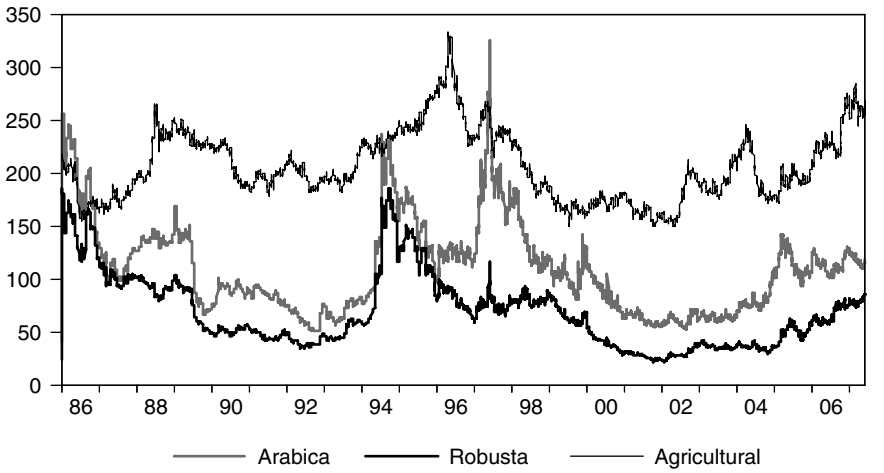

FIGURE 1
Price movements in the coffee market.

Coffee Organization (ICO), which lasted from 1962 to 1989 and tried to control prices with the help of an export quote price system, and the Association of Coffee Producing Countries (ACPC), which lasted from 1993 to 2002 but failed to persuade the coffee exporting countries to retain part of their exports to increase prices.

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Committed Capital

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The first stage in the life cycle of private equity funds is fundraising, seeking new capital from outside investors. Investors or limited partners (LP) sign a legal agreement, called a limited partnership agreement, that binds them to provide cash for the private equity fund up to a certain previously agreed-upon amount (the commitment or committed capital) (in the example in Figure 1, the commitment is $500 million). However, although the capital is committed, it is not necessarily transferred immediately to the private equity fund. As Figure 1 shows, the cumulative capital calls or drawdown capital equals zero at the time of fund creation (Q1 1996 in the example).

In the next stage, the fund managers seek investment opportunities in target companies. At this stage, the fund might not yet generate profits, but it does charge annual management fees (for simplicity, we do not consider these fees in Figure 1). These fees are paid with the first capital calls of the fund. Thereafter, the fund starts investing in tranches in target companies. At this time, some of the committed capital starts to be called. The cumulative capital call (or drawdown capital) is the amount of capital that is actually withdrawn at this time. In Figure 1, note that the entire amount of committed capital has been withdrawn or called by the year 2000. Note also that the invested capital never reaches the gray committed capital line. This is because the limited partner has already received returns from the earlier investments as well as used some of the

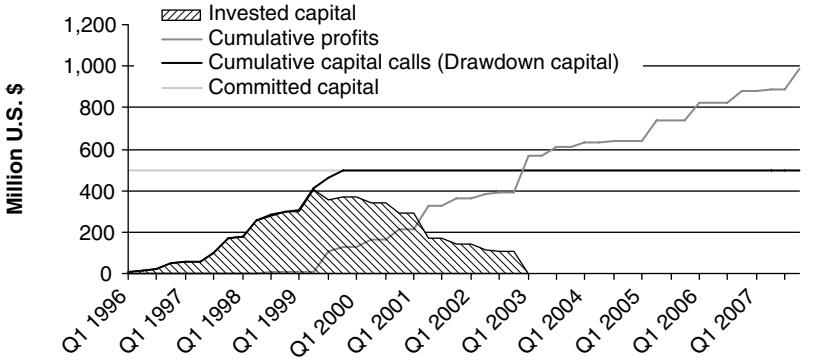

FIGURE 1
Typical capital flow profile of a large U.S. buyout fund.

drawn capital for the management fees of the fund. However, the limited partner may use those returns for later capital calls in the fund's lifetime.

As shown in Figure 1, during the year 2003 the limited partners receive their invested capital back. They continue to participate in the later return distributions until mid-2007, when the fund is liquidated (for a more in-depth examination of this topic, see Anson, 2006; Fraser-Sampson, 2007).

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Commodity Credit Corporation (CCC)

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The Commodity Credit Corporation (CCC), which is government-owned and -operated, was established in 1933 to assist American agriculture by stabilizing, supporting, and protecting farm prices. It was funded and managed in affiliation with the Reconstruction Finance Corporation (for further details, see Stephenson, 2005). However, in 1939, control of the CCC was transferred to the U.S. Department of Agriculture (USDA). In 1948, it was reincorporated as a federal corporation within the USDA by the Commodity Credit Corporation Charter Act (62 Stat. 1070; 15 U.S.C. 714).

The CCC is managed by a board of directors and chaired by the Secretary of Agriculture, who is an ex-officio director of the board. Board members are appointed by the U.S. President with the advice and consent of the U.S. Senate. The CCC has no operating personnel of its own; all employees and board members are USDA officials (FSA, 2007).

The CCC has a capital stock of U.S. $100 million subscribed by the United States (15 U.S. Code Section 714e). With the 1987 Amendment, the CCC can issue and have outstanding obligations up to $30 billion at any one time (15 U.S. Code Section 713a-4).

The major operations of the CCC involve price support, foreign sales, and export credit programs for agricultural commodities, along with some secondary production and marketing tasks. It is responsible for managing the supplies of twenty agricultural commodities via loans, purchases, and payments (for further details on the specific commodities, see Becker, 1994). To ensure balanced and adequate supplies, the CCC organizes storage and reserve programs, aids in the orderly distribution of agricultural commodities, and authorizes sales to other domestic and foreign government agencies. Under the 1966 Food for Peace Act, the CCC also began to manage donations to relief agencies to combat hunger and malnutrition in developing countries (FSA, 2007). The annual budget programs of the CCC are submitted to and approved by the Congress (15 U.S. Code Section 714c).

Since the passage of the 1996 Federal Agricultural Improvement and Reform (FAIR) Act, the CCC has managed production flexibility contract (PFC) payments to eligible farmers, who are subject to various conservation compliance obligations. The FAIR Act, however, also reduced the

maximum payment farmers are eligible to receive each fiscal year. For more information on the FAIR Act and its implications, see Basic Foodstuffs Service Commodities and Trade Division (1998). Further information on the CCC's history can be found on the website of the USDA's Farm Service Agency, www.fsa.usda.gov/ccc/default.htm.

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Commodity Exchange Act

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The Commodity Exchange Act (CEA) was created in the 1920s to standardize and monitor the trading of grain and other agricultural commodities futures by investors. In 1936, the CEA was passed by the U.S. government, substituting the original, Grain Futures Act of 1922. The act was passed to decrease or terminate variations in the prices of grains of organized futures exchanges. The CEA is the pillar for federal regulation of trading in commodity futures and for reauthorization of the Commodity Futures Trading Commission (CFTC), which is the chief regulator for futures markets (http://www.cftc.gov). In 2000 the CEA was last reauthorized when the Commodity Futures Modernization Act was passed.

Commodity Futures Indices: Spot, Excess, and Total Return

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The major goals of commodity indices, or commodity benchmarks, are to quantify the performance of the underlying commodities, and to provide market participants with a continuous information basis. To calculate commodity performance, these indices use commodity futures contracts, which have a finite maturity. It is thus necessary to use a "chaining" method, which allows for an infinite chain of commodity futures with finite maturities. Depending on whether the objective is creating a benchmark for commodity price levels or providing an investable benchmark, the relevant chaining method is either replacement or rolling. A rich source of information about index construction can be found in Goldman Sachs (2007). Good surveys

on the economics of different calculation methods can be found in Erb and Harvey (2006), Fabozzi et al. (2008), and Gorton and Rouwenhorst (2006).

SPOT RETURN INDEX

To calculate the spot return index, we use the so-called near-month contract, or the spot month contract, as a proxy for spot prices of each commodity. Just prior to maturity, the calculation is replaced by the next contract. For example, in the S&P GSCI™ spot return index, 20% of the nominal futures contract is replaced from the fifth to the ninth trading day of each replacement month by the second-shortest futures contract, as follows:

- Trading day 4: 100% November Contract – 0% December Contract
- Trading day 5: 80% November Contract – 20% December Contract

…

- Trading day 9: 0% November Contract – 100% December Contract

This means that on five trading days per month, the spot index underlying is slightly modified. The replacement is performed without considering any discrepancies in the value of the shortest and the second-shortest futures contracts. There are no adjustments in the number of futures contracts. As a result, the spot return index declines if a commodity futures contract is replaced in backwardation, and it increases if a commodity futures contract is replaced in contango. Thus, the spot return index can be interpreted as a general measure of the price level of a commodity basket. The performance cannot be replicated with a trading strategy because a simple conversion of the futures contract is impossible. This also implies that the spot return index is an inappropriate basis for financial products.

EXCESS RETURN INDEX

The underlying futures of the excess return index are also replaced by the near-month contract of a specific commodity. But, contrary to the spot return index calculation, the transfer from the near-month contract to the next contract is a rollover instead of a replacement (which is again performed from the fifth to the ninth trading day in the month when the futures contract is rolled). For this reason, we need to calculate the chaining method so that the performances when selling the near-month futures contract at the closing price and when buying the second-shortest futures contract at the closing price are identical. During the rollover, the share of the respective underlying commodity futures contract in the index is reduced if the second-shortest futures contract has a higher price than the near-month contract. This constellation is called contango, and it will result in rollover losses. On the other hand, if the underlying commodity futures contract is in backwardation, the share of the respective underlying commodity futures contract will increase when the futures contracts are rolled over. In this situation, when the near-month futures contract is higher than the second-shortest futures contract, more units of the lower quoted futures contract are bought, which yields to rollover gains.

To summarize, the excess return index captures the movements of commodity

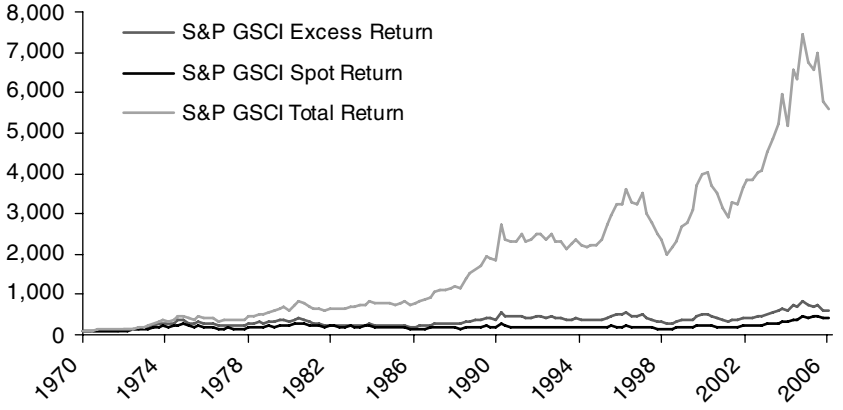

FIGURE 1
Performance of the S&P GSCI indices. (From Bloomberg.)

prices and roll performance. Because investors can replicate the trading strategy, the index can be used as a basis for financial instruments. Depending on the construction method, the underlying excess return index is an uncollateralized futures instrument.

TOTAL RETURN INDEX

To buy or sell futures contracts, investors must deposit funds into what is known as a margin account. The amount deposited at the time the contract is first entered into is the initial margin, and is determined by a fixed ratio to the underlying capital (Hull, 2002). The initial margin is lower than the underlying capital. Thus, we arrive at the third calculation method. The rolling procedure from the near-month futures contract to the second-shortest futures contract is identical to the method used for the excess return index. The only exception is that the total return index is based on a fully cash collateralized commodity investment, which means the whole futures position must be deposited. For example, suppose the index level equals 100. Then the replication strategy may be as follows:

- The investment bank sells an investment product on the index and receives U.S. $100.
- The investment bank wants to replicate the investment product, and buys a futures contract with the value of U.S. $100. The investor must deposit an initial margin of U.S. $10, which will earn the risk-free rate. The remaining U.S. $90 can also be invested in the risk-free rate. Typically, the U.S. dollar T-bill rate is used as a proxy for the risk-free rate.

These interest earnings add to the performance of the total return index. The difference between the total return index and the excess return index is the disposition of the dividends, which are credited to the investors on a daily basis. Investors in an excess return index do not participate in dividend earnings. They earn the roll and price performance of the underlying commodities exclusively.

However, it is not truly possible to compare the excess return index and the total return index, because the excess return plus the T-bill rate does not equal the total return. The rationale is found in the influence of

the reinvestment of interest rate earnings into further futures contracts, as well as in the investment (withdrawal) of the profits (losses) from the futures contracts in (out) of the T-bills. As Figure 1 shows, over long periods of time, this compound interest effect results in large differences between the values of the two indices. This effect is particularly noticeable during periods of high U.S. dollar interest rates, such as during the 1970s and the 1980s. Furthermore, the total return index may earn positive returns, even if the underlying commodities do not.

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Commodity Futures Modernization Act of 2000

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Before the year 2000, the financial regulators in the United States did not permit the trading of futures contracts on individual stocks or narrow-based indices, such as an index of technology stocks. A change in the market regulatory structure was required before single stock futures could be introduced. Brokers in the single stock futures markets are regulated by both the CFTC and the SEC. This act also provided the CFTC with the oversight to regulate over-the-counter (OTC) currency trades placed by retail clients.

The act, however, specifically addresses the regulatory challenges in the U.S. OTC markets. Trades between institutions and professional investors in the OTC markets for currencies, interest rates, commodities, credit risks, and equity indices are now specifically exempt from the regulation of the Commodities Exchange Act. Some swaps and hybrid products are also included in these regulatory exemptions.

Commodity Futures Trading Commission

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Trading agricultural commodities via futures contracts in the United States has existed for approximately 160 years and has been under federal supervision since the early 1920s. Recently, with a universe consisting of 9500 hedge funds, trading in futures contracts has caused an explosive growth in the commodities industry, over and above the standard agricultural

commodities well into different financial instruments, such as international currencies, U.S. and international government securities, as well as U.S. and international stock indexes. The Commodity Futures Trading Commission (CFTC, http://www.cftc.gov) was created as a result of the Commodity Exchange Act (CEA) to keep watch over the U.S. futures and options markets. The CFTC is a U.S. federal agency established by the CFTC Act of 1974 with its main objective being to guarantee that futures markets behave in an efficient and organized manner. The CFTC is the main regulatory body for futures markets in the United States and operates as an agency of the U.S. government. The CFTC's mission is to stand for the rights of the investing public by protecting investors from deception, and unethical practices occurring from the sale of commodity futures, financial futures and options, as well as maintaining the proper clearing and functioning of futures markets.

Commodity-Linked Bond

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A conventional bond is usually issued as a long-term credit financing. It offers holders the contractual right of a regular interest payment (coupon) during the holding period, as well as full redemption of the principal upon maturity. The price of a conventional bond equals the discounted expected future payments from the principal and interest payments. Consequently, the price is determined by the development of the risk-free rate, and the contingency risk of the issuer.

A commodity-linked bond, however, is linked to a commodity through an option-like structure. The coupon, principal payments, and therefore the price of commodity-linked bonds are determined to a certain extent by the development of the price of the underlying. This structure allows a country or a company to hedge against adverse price movements (Johnson, 2004). In the case of a country, this could be a decline in price of its natural resources, whereas in the case of a company, this could be an increase in the price of its raw materials.

The coupon or principal payment from a commodity-linked bond has an option-like character. If a developing country, for example, has plenty of natural resources like precious metals, but is in need of capital, it may issue a commodity bond linked to precious metals. The bond can be structured so that if the price of precious metals falls below a certain strike price, the issuer (or borrower) is allowed to pay a lower coupon and/or principal payment to the holder. If the price of precious metals rises above the strike, then the payments from the commodity-linked bonds would not rise. This payoff profile resembles a short put, where the holder of the short option receives a premium from the option writer for the one-sided risk. In a similar way, the holder (investor) of

a commodity-linked bond receives a premium from the issuer (borrower) for bearing the one-sided risk of falling precious metals prices in the form of a lower bond price or higher coupons.

The payoff provision of a commodity-linked bond may also somewhat resemble a long call option. The holder (investor) in this case would participate in rising prices of the underlying above the strike price; the issuer (borrower) would receive a premium from the investor in the form of lower interest (coupon) for bearing the downside risk. Commodity-linked bonds thus offer the possibility of transferring commodity price risks to investors or speculators (Dodd, 2004).

A special case of a commodity-linked bond is the so-called commodity-linked bull and bear bond. It was first issued in 1986 by the kingdom of Denmark and was linked to gold price movements. The bond has a bull and bear component issued in two tranches: the bull component earns on price increases and the bear component earns on price declines. The redemption payments for the bull and bear tranches vary along with the underlying commodity. But the commodity-linked bull and bear bond is usually structured so that the average redemption amount the issuer must pay, with both the bull and bear tranches together, is independent of the commodity movements. In other words, exposure to the underlying's price movements is neutralized internally. There are two main reasons for this construction: (1) issuers may benefit from funding costs (coupon) that are lower than those for "standard" debt and (2) although investors receive a lower coupon than they would for comparable standard debt, they may benefit from an increase in the redemption value (the bull tranche), or a decline in the underlying commodity price (the bear tranche) (for a more detailed description, see Reilly and Brown, 2005; Walmsley, 1998).

Commodity-indexed bonds are closely related to commodity-linked bonds. Commodity-indexed bonds are linked to commodities through a forward derivative contract (Dodd, 2004). To continue the previous example, a developing country might issue a commodity-indexed bond with a short forward character. In this case, if the prices of precious metals fall, the issuer (borrower) pays less. If prices rise, the holder (investor) participates in the rise. Contrary to commodity-linked bonds, however, there is no extra premium because the payoff profile is symmetrical. Neither the issuer nor the holder takes any one-sided risks, and neither has rights but no obligations. However, contrary to a commodity-linked bond with a short put option character, the issuer will not benefit from a rise in prices (Walmsley, 1998).

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Commodity Option

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A commodity option gives the holder the right (but not the obligation) to trade an underlying at a fixed price (strike price) in the future. For many commodity options, the respective future contracts are chosen as underlying since most commodity trading is in fact in futures contracts. More precisely, call and put options are to be distinguished. The holder of a call option may buy the underlying from the counterparty (option writer) while the holder of the put option has the right to sell. In the case of a call option it is rational to exercise the option when the spot price of the underlying is higher than the exercise price. Otherwise, it would be cheaper to buy the underlying directly on the market. The opposite is true for put options. The payoff of an option is always greater or equal to zero. To compensate the option writer for potential future payments, an option premium must be paid at the initiation of the contract. Exercise of the option may take place on a single future point of time (European style option) or during the whole period until expiry date (American style options).

On futures exchanges standardized option contracts are traded. An example is the 100 oz. gold futures option on the Chicago Board of Trade (CBOT). The exercise style is American. At exercise, the holder of a call option enters a long position in the futures contract and receives cash equal to the most recent futures price minus the exercise price. Since futures and spot prices are positively related, call options may be used to hedge against gold price increases. Due to the practice of mark-to-market, the value of a futures contract is always equal to zero. Thus, it may be closed immediately without cost. Otherwise, it represents an obligation to buy 100 oz. of gold at a future point of time. When exercising a put option, the holder enters a short futures position and receives cash equal to the exercise price minus the current future's price.

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Commodity Pool

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A commodity pool is a fund operated with the aim of trading commodity futures or option contracts. Trading in the futures market is difficult for individual investors, especially for beginners, so instead of dealing individually, a commodity pool offers the individuals the possibility to be part of a big fund (Waldron, 2003). The individual investors merge their money in a single fund (so that no one has an individual account) and they trade it as one, and in this way they have bigger capital resources (Miller, 1997). The risk is limited to the amount contributed into the fund, that is, the highest loss is the money invested. On the other hand, the profits are directly proportional to the investment. Another advantage is that this allows the investors to invest in diverse types

of commodities more easily than if they were investing individually, because they are now part of a big fund. Many of these commodity pools are hedge funds, which use high-risk techniques looking for big gains (Kolb and Overdahl, 2007), so it should be managed by a skilled broker to minimize the risk. An additional risk is that there have been several cases where investors' funds have been misappropriated, but the Commodity Futures Trading Commission (CFTC) is fighting against this by introducing tight regulations. Lastly but very importantly, this should not be confused with an omnibus account, which is an account used for financial intermediaries to aggregate their clients' orders in a single account.

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Commodity Pool Operator (CPO)

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The commodity pool operators (CPO) are the managers of funds that invest customer money in futures and options markets (Weiner, 2002). The definition given by the Commodity Exchange Act includes not only persons who manage commodity pools but also persons who operate other funds, which trade in futures or commodity markets (Meer and Mehrespand, 2003). Likewise a CPO can also operate one or more commodities pools. They should not be confused with the commodity trading advisors (CTAs), because CPOs manage funds, investing the money, whereas the CTAs advise of futures and commodity options trading to them, that is, in general, CTAs are hired by CPOs to make investment decisions. CPOs, and also CTAs, have to register with the Commodity Futures Trading Commission (CFTC) (Fung and Hsieh, 1999) and, although they are tightly regulated by CFTC, they have grown over the last few years. CPOs operate with larger amounts of money, and they are advised by specialists, so they can take advantage of their size to obtain bigger margins. Moreover, in a bear market (when the prices of securities are falling in the market or they are expected to do so) they can remain in the market more easily than other investors until prices grow and their securities become profitable again.

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Commodity Price Index

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Commodity price indices are publicly available indices that aim to represent changes in the broad commodity market or on a specific subclass of commodities. Commodity indices are benchmarks for investment performance in this market and they are calculated based on spot or futures commodities prices. Commodities such as energy, agricultural, livestock, industrial metals, and precious metals have diverse factors impacting their spot price including seasonality and weather events. Market changes, such as the impact of China's entrance, can affect and change correlations creating a very dynamic and often extremely volatile process. Futures commodity prices are further impacted by the carrying cost, basis risk, and roll out costs. Commodities have a return profile that is very different from stocks and bonds and they are considered defensive securities because of their superior performance in cases of unanticipated inflation, whereas stocks and bonds tend to provide negative returns in such conditions. Commodities have low or negative correlation with the traditional asset classes so they are usually included in an optimally diversified portfolio strategy.

There are many different weighting methods to construct commodity indices. The Goldman Sachs Commodity Index (GSCI™) follows an economic weighting method, where weights are determined by the average of world production in the last 5 years of data published by the Organization for Economic Cooperation and Development (OECD). There are also GSCI™ subindices focusing on specific commodities. Other examples of investable commodity indices are Dow Jones-AIG Commodity Index (DJ-AIGCI™) and Standard and Poor's Commodity Index (SPCI™). The DJ-AIGCI™ weights are calculated based on liquidity, which is an endogenous measure from the futures markets and, to a lesser extent, also on exogenous production data. The SPCI™ provides broad-based commodity indices, calculated using geometric and arithmetic calculations, with weights following a methodology based on the commercial open interest (COI), published by the Commodity Futures Trading Commission (CFTC), in order to capture the level of viable trading that occurs in each commodity. Other indices include Commin Commodity Index, Reuters/Jefferies CRB Index, Rogers International Commodity Index, NCDEX Commodity Index, Deutsche Bank Liquid Commodity Index, and UBS Bloomberg Constant Maturity Commodity Index (CMCI™). Some commodities indices also underlie exchange-traded futures contracts.

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Commodity Research Bureau (CRB)

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The Commodity Research Bureau (CRB) is the world's leading provider of commodity market information. The CRB data center offers end-of-day futures price data for over 600 global markets, as well as end-of-day options on futures price data, and daily implied and historic volatility data for over 100 global markets. CRB also provides investors with open, low, and closed (settlement) contract volume, and open interest data on all contracts from the major commodities exchanges worldwide.

CRB was founded in 1934 by Milton Jiler, with the aim of providing brokers, advisors, commercial users, and speculators with as much relevant information as possible about the commodities markets. A network of more than a dozen sources of current fundamental information for each exchange-traded commodity, guaranteed the new company's success. The first report, called the *CRB Futures Market Service*, was published in February 1934. In 1939, CRB published its first *Commodity Year Book*, which incorporated comprehensive statistical information on all exchange-traded commodities. In 1956, CRB published the first issue of *Commodity Charts Service*, considered a precursor to today's technical analysis industry. That same year, Milton Jiler's brother William started the *Trendline Chart Service*, and developed the CRB Index into an overall reflection of price activity in the commodity markets.

Today, CRB publishes three index series:

1. The CRB Spot Indexes date back to 1934, when the Bureau of Labor Statistics computed a daily commodity price index from quotations for price-sensitive commodities. The index itself was first published in January 1940, and was replaced in 1952 by a new daily index of spot markets. The spot market index captures the price movements of 22 basic commodities, such as raw materials, that are influenced strongly by economic changes. It is calculated as an unweighted geometric mean of individual price relatives, the ratios of current prices to base prices. The geometric mean is used to shield the index from extreme price movements of individual commodities. CRB also provides subindexes for metals, textiles, livestock, fats and oils, raw industrials, and foodstuffs.
2. The Reuters CRB Index (CCI) was introduced in 1957. The futures index originally consisted of 28 commodities, with the aim of mapping a sufficiently large commodity universe. Like the spot index, the CCI uses geometric averaging and equally weights the index components. This procedure also serves to protect CCI from extreme changes that are common to important commodity (classes) like oil or energy, while allowing less important commodities (from a world production standpoint) to receive higher weights. The CCI is thus permanently rebalanced due to its equal weighting.
3. The Reuters/Jefferies CRB Indexes (RJ/CRB) is a widely recognized indicator of global commodities markets. The RJ/CRB was founded in 1956 and

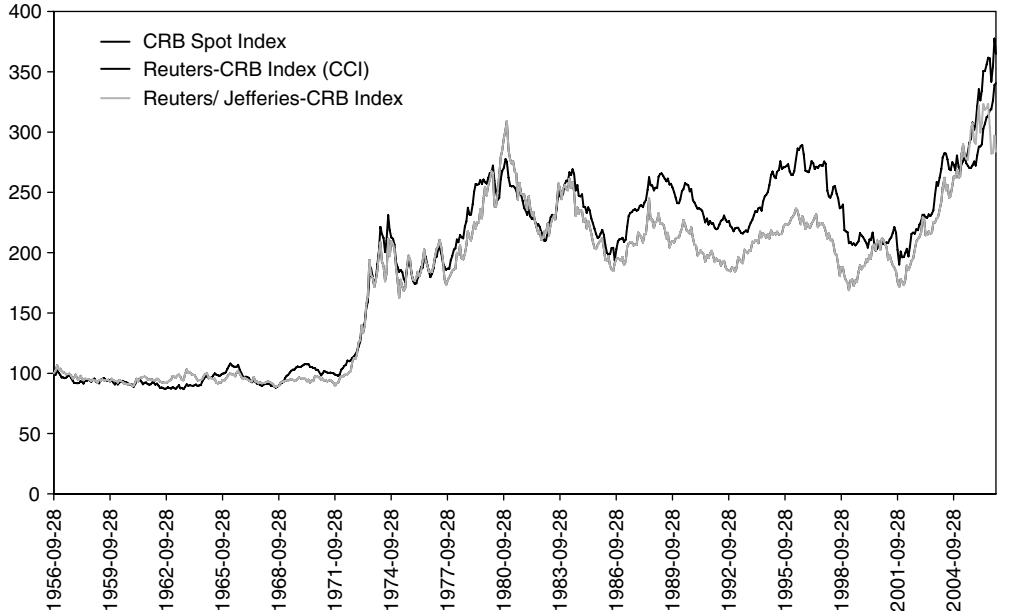

FIGURE 1
Performance of the Reuters CRB Spot Index and the Reuters/Jefferies CRB Index. (Data source: Thomson Financial Datastream.)

renamed the Reuters/Jefferies CRB Index in 2005.

The performance of the three indexes is displayed in Figure 1. As a benchmark, the RJ/CRB is designed to provide timely and accurate representation of a long-only, broadly diversified investment in commodity futures contracts. From its introduction through 1995, RJ/CRB underwent nine weighting revisions to ensure its representativeness in different market environments. The tenth major revision took place in June 2005, when the number of listed commodities was expanded from 17 to 19.

The index is considered an investable product. The component weightings are rebalanced monthly, and reflect the relative significance and liquidity of the various commodity markets (energy 39%, metals 20%, softs 21%, grains 13%, and livestock 7%). Its value derives from nearby futures contract prices. For each commodity, a 4-(business) day rollover schedule is used, assuming a constant dollar investment.

The RJ/CRB uses a four-tiered approach to commodity allocation: petroleum products (WTI crude oil 23%, heating oil 5%, and unleaded gas 5%), highly liquid commodities (natural gas, corn, soybeans, live cattle, gold, aluminum, and copper, each 6%), liquid commodities (sugar, cotton, cocoa, and coffee, each 5%), and commodities that provide diversification (nickel, wheat, lean hogs, orange juice, and silver, each 1%). The RJ/CRB is available as a spot and a total return index.

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Commodity Trading Advisor (CTA)

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Commodity trading advisors or CTAs are professional money managers (firms or individuals) that offer advice and active services, like derivatives trading or running managed futures account, to, and on behalf of, their clients. This kind of activity on the U.S. markets requires a registration with the U.S. Commodity Futures Trading Commission (Summa, 2005).

Commodity funds that are managed by CTAs count to the modern alternative investments. Managed commodity funds or managed futures are publicly offered investment vehicles that may invest in forwards, futures, options, and other derivative contracts on a wide range of assets: physical commodities (precious and nonprecious metals, agricultural products like grains, soft commodities, etc.), and financial instruments (equity indices, foreign currency, and fixed income products) (Potter et al., 1996; Gregoriou et al., 2005).

In the early years, CTA's trading was indeed limited to commodities (hence the name CTA)—however, with the introduction of derivatives on a series of financial and other products, their investment scope widened considerably. Nowadays, CTA trading programs are characterized by the market strategy (which can be either trend-followers or market neutral) as well as the market segment (agricultural, currency, financial, metals, stock index, or diversified). It is worth noting that such funds often keep highly leveraged positions through borrowing or the use of economic leverage through derivative assets, thus generating fairly non-normal return profiles (Kat, 2004).

CTAs are, to a certain extent, similar to hedge funds. CTAs and hedge funds might both invest in similar assets and employ comparable strategies. The main distinction between CTAs and hedge funds lies, however, not in the strategies CTAs follow but is a more structural one: while investors keeping a managed account are able to follow all the trading that takes places on their behalf on a regular basis, hedge funds still remain an opaque investment form in this respect (Edwards and Liew, 1999).

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Commodity Swap

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This is a swap in which one party delivers given amounts of a commodity to another party at given dates. The other party can pay back either a fixed price (fixed against floating swap) or a variable price (floating against floating swap), which could be the value of another commodity or the value of an index. The most commonly used commodity market indexes are Goldman Sachs Commodities Index (GSCI) and Commodities Research Bureau Index (CRB).

An example of a commodity swap on the oil can be found in Table 1: every 6 months the oil producer (*A*) sells 1000 barrels of oil to another party (*B*) who pays 70 U.S. dollars per barrel. As it happens for the interest rate swaps (IRS), the two parties actually exchange the differences between the two due payments (as shown in the fourth column of Table 1). This means that *B* will actually buy the oil on the spot market and will either receive from *A* whatever was spent more than 70 USD or give to *A* whatever was spent less than 70 USD.

With the oil swap, both the oil producer and the oil buyer are hedged against changes in the spot oil price (Claessens and Duncan, 1994; Cusatis and Thomas, 2005). Often, to avoid the negative effects of extreme volatile periods, the variable payment is based on an average of an index over a given period of time (e.g., a week, a month, a quarter).

TABLE 1

Example of a Commodity Swap on Oil

Time (in months)	*A* gives barrels (USD/ barrel)	*B* pays fixed price (USD/ barrel)	Notional: 1000 barrels
6	68	70	*B* pays 2000 USD to *A*
12	70	70	No payments
18	75	70	*A* pays 5000 USD to *B*

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Community Development Venture Capital

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Community development venture capital (CDVC) is the use of venture capital (VC) to finance businesses to create both financial and social returns for investors. Hence, these funds pursue a double bottom-line approach in creating financial and social returns. The aimed social returns can be manifold. Many funds intend to create high-value jobs, entrepreneurial capability, and wealth for low-income socioeconomic groups and the deprived communities. Others support environmental-friendly

products, sustainable management practices, or minority owned businesses. This leads to a diverse universe of CDVC funds. In general, CDVC funds differ in multiple dimensions from traditional VC funds. These dimensions are, for example, social goals, degree of profit orientation, degree of government involvement or focused investment stages, deal sizes, and industries. Finally, some CDVC funds are incorporated as nonprofit organizations and others as for-profit organizations (Jegen, 1998; Rubin, 2001).

Since CDVC funds use traditional VC principles, they also seek to invest in businesses with great ideas, outstanding management teams, and a strong growth potential. Furthermore, CDVC funds use equity as well as near-equity investments and support their portfolio companies with a wide range of technical assistance such as management expertise and networking to pursue their goals. Due to their "double-bottom line approach", CDVC funds frequently operate in different regions compared to traditional VC funds. The regions CDVC funds operate in are often economically deprived. In addition, their deal sizes and fund volumes tend to be smaller and the industry mix of their portfolio tends to be more diversified compared to traditional funds (Rubin, 2001).

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Companion Fund

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Private venture capital and private equity funds are typically organized as limited partnerships that have a 10–13 years horizon. The limited partners are institutional investors (e.g., most commonly the pension funds, but also banks, insurance companies, and endowments) that are the sources of capital. The general partner is the fund manager that takes care of the day-to-day operations of the fund. Venture capital and private equity fund managers may simultaneously operate more than one fund, which are known as companion funds.

The relationship between the limited partners and the general partner is governed by the privately negotiated limited partnership contract. One covenant often found in limited partnership contracts in the United States (Gompers and Lerner, 1996) and in different other countries around the world (Cumming and Johan, 2006) is a prohibition on co-investment by companion funds; that is, the companion funds are not permitted to invest in the same entrepreneurial firm. The reason for this co-investment prohibition is that the capital from follow-on companion funds may be used to bail out the bad investments of the prior fund by the same fund manager, which is to the detriment of the institutional investors of the follow-on fund. Also, limited partnership contracts often limit the extent to which fund managers can engage in fundraising activities to

start companion funds. Covenants limiting fundraising activities often specify that fundraising for companion funds is not prohibited outright but is prohibited for the first five years in the life of the fund.

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Company Buy-Back

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A company buyback is one instance out of the empirically observed exit strategies in venture capital finance, which are initial public offerings (IPO), acquisitions (also often called trade sales, where the whole entrepreneurial firm is sold to another company), secondary sales, buybacks, and liquidations (i.e., write-off). In a buyback, either the entrepreneur or a group of insiders in the firm, that is, the management, purchases the venture capitalist's shares in the company. In a sense it is a special case of the broader category of a secondary sale, where only the venture capitalist sells its shares in the company to some other investor in the secondary market. The distinctive characteristic of a buyback lies in the fact that it is the entrepreneur himself, eventually together with senior management, who buys the venture capitalist out, to provide him with liquidity for his investment and to regain full control over the firm. Since the nature of venture capital finance lies in the fact that the entrepreneur or the firm is short of liquidity, a buyback will often go along with considerable borrowing, leading to a leveraged buy out (LBO) or management buy out (MBO). As the markets for leveraged finance transactions are still developing, the buyback option is less available for venture capital–backed firms of high value. Hence venture capital finance contracts often include contractual provisions (redemption rights) that give the venture capitalist the right to demand a buyback from the entrepreneur, if an IPO or a trade sale has not occurred within a certain time frame, that is, the firm is of potentially less value.

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Conditional Value-at-Risk (CVaR)

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Value-at-risk (VaR) is a downside risk measurement widely used by financial institutions for internal and external purposes. It has the appealing property of expressing risk in only one figure and is the estimated loss of an asset that, within a given period (usually 1–10 days), will only be exceeded

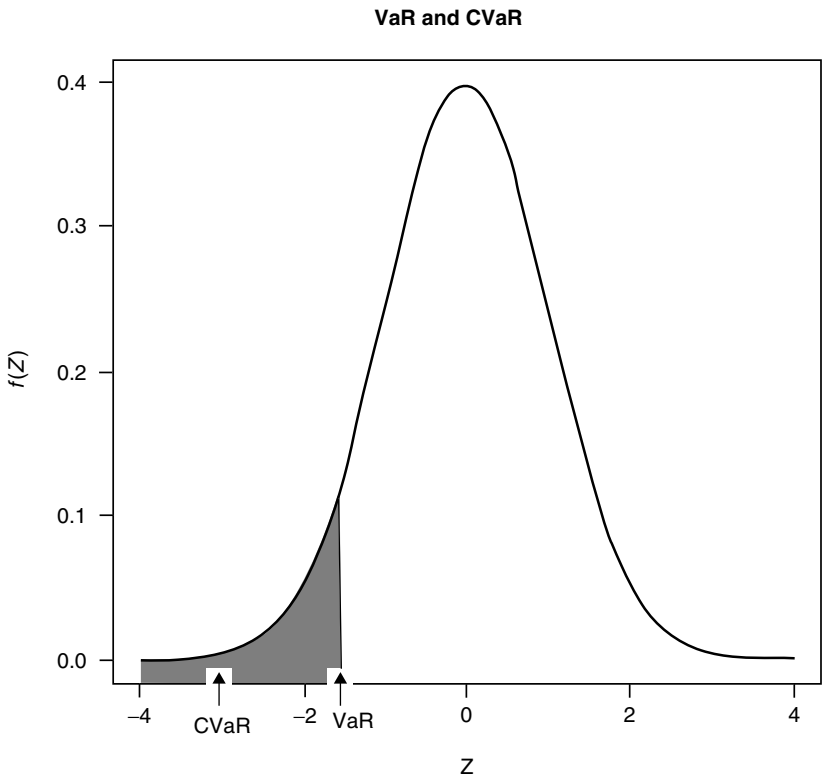

FIGURE 1
The CVaR is the expected loss in case of an extreme event.

by a certain small probability θ (usually 1 or 5%). Thus, the 1-day 5% VaR shows the negative return that will not be exceeded within this day with a probability of 95%:

$$\text{prob}[\text{return}_t < -\text{VaR}_t \mid \Omega_t] = \theta \qquad (1)$$

where Ω_t denotes the information set available at time t.

In statistical terms, we need to consider the 5% quantile of the probability density function of asset returns. Assuming the returns to be normally distributed, the VaR can be calculated as the deviation of Z—which is the value of the distribution function of the standard normal distribution—times the standard deviation σ minus its mean μ:

$$\text{VaR} = -(Z\sigma - \mu) \qquad (2)$$

The conditional VaR (CVaR), also called the mean excess loss, mean shortfall, or tail VaR, is the expected loss under the condition that the loss is already higher than the VaR:

$$\text{CVaR} = E[\text{return}_t | \text{return}_t \leq \text{VaR}] \qquad (3)$$

So while the 5% VaR estimates the loss that will not be exceeded under normal market circumstances with a probability of 95%, the CVaR estimates the expected loss under the 5% extreme cases when the returns are even more negative than the VaR. This relationship is shown in Figure 1, where the probability density function of the standard normal distribution has a Z value of −1.645. In contrast to the conventional VaR, the CVaR is a coherent risk measure that

TABLE 1

Z Values for Different Significance Levels (May 1, 2007)

Significance (%)	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0.5
Z value	1.695	1.751	1.812	1.881	1.959	2.054	2.170	2.326	2.576
VaR	−1.345	−1.390	−1.440	−1.496	−1.561	−1.637	−1.732	−1.859	−2.063
CVaR	−1.614	−1.614	−1.614	−1.614	−1.614	−1.614	−1.614	−1.614	−1.614

is more appropriate under extreme market circumstances such as a financial crisis (Artzner et al., 1999).

There are two approaches for estimating the CVaR (Dowd, 2002). One is a parametric approach, which assumes a standard normal distribution of the return process. The advantage of this approach is that the CVaR can be calculated by the mean and the variance of the returns. The second approach is nonparametric and uses a historical simulation of the CVaR. This method sorts the past *n* returns in an ascending order and observes the lowest 5% directly rather than estimating them. The advantage of this approach is that no distributional assumptions are necessary. Both approaches require estimating the normal VaR for significance levels below 5% but above 0% and then taking the averages of those VaRs. In the case of the parametric approach, the 5% VaR is calculated according to Equation 2. The value of the standard normal distribution *Z* changes for the significance levels shown in Table 1. The VaR is then recalculated for the respective significance level. The CVaR is computed by taking the averages of all the VaRs from 4.5 to 0.5%. Table 1 also shows the respective VaR and CVaR of the FTSE 100 index for the 1st of May 2007. The observation period for the VaR calculation is 250 trading days. The CVaR of −1.614 tells us that on this specific date, the expected loss was 1.614% in the case we encountered an event with returns being even more negative than the VaR.

Figure 2 shows the development of the VaR and the CVaR for the FTSE 100 index from January 1, 1990 to May 1, 2007 (4522 observations). By definition, the CVaR is always below the normal VaR, but otherwise follows the VaR in its development.

However, the existence of volatility clustering in the return process leads to consecutive hits in highly volatile periods, since the VaR and CVaR are very inertial, in which case the risk is systematically underestimated. This systematic underestimation comes from the false assumption of normally distributed returns.

In contrast, the historical simulation approach is nonparametric and does not depend on any distributional assumptions. The method is to sort the returns of the past 250 trading days in an ascending order and determine the average of the 5% lowest returns. The result is shown in Figure 3, which shows the 5% historical simulation HS-VaR and the HS-CVaR for the FTSE 100 index.

It is easy to criticize both the approaches. In the first approach, the normality assumption is clearly violated since most financial returns exhibit significant skewness and excess kurtosis, which make an extreme event more likely than in the case of a normal distribution. Thus, the CVaR systematically underestimates the actual loss. Estimating the CVaR by historical

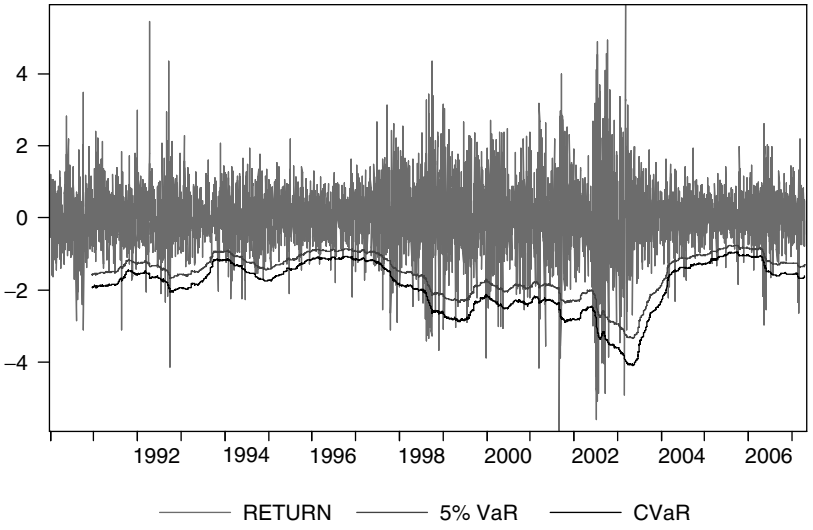

FIGURE 2
CVaR for the FTSE 100 index (January 1, 1990 to May 1, 2007).

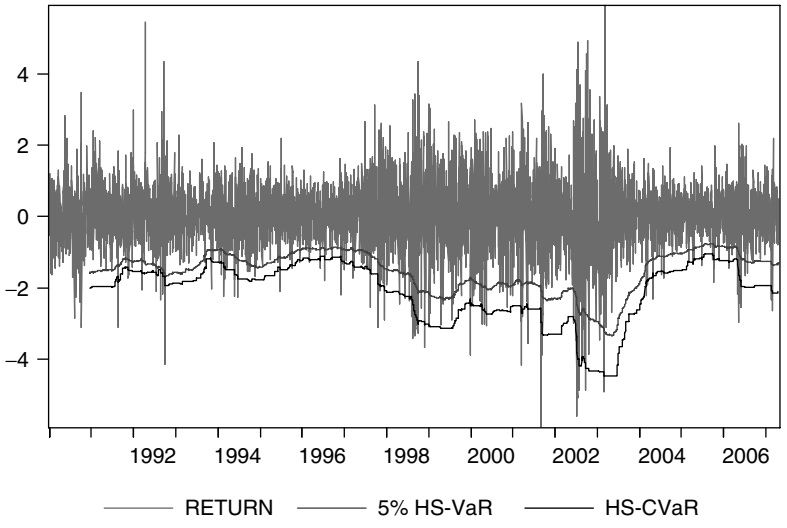

FIGURE 3
HS-VaR and HS-CVaR for the FTSE 100 index (January 1, 1990 to May 1, 2007).

simulation has the main disadvantage that all past n returns have the same weights while the $(n + 1)$th return has a weight of zero. This rolling window property leads to a sharp increase in the CVaR if an extreme negative return enters the window, and accordingly to a sharp decrease when this extreme negative return drops out again. For instance, the HS-CVaR increased dramatically during the highly volatile period in 2002 and then returned to a modest −2% within a few months. Most financial time series exhibit volatility clustering so that extreme occurrences in the past few days

are much more relevant for the determination of the actual risk than extreme events that happened long ago.

By now an extensive literature on various VaR models exists that deals with the disadvantages of both the approaches discussed above. The hybrid approach of Boudoukh et al. (1998) uses historical simulation with higher weights on current observations that decline exponentially into the past, thus modeling the actual risk behavior more adequately. Danielson and De Vries (2000) use extreme value theory to model the risk during extremely volatile periods more accurately. The semiparametric approach of Engle and Manganelli (2004) uses a quantile regression framework that models the specific quantile of the returns directly rather than the whole return distribution. This approach has been shown to be superior in many studies (e.g., Kuester et al., 2006) and is capable of producing reasonable long-term forecasts.

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Confirmation Statement

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A confirmation statement is a confirmation of execution of an order. It has to contain all facts concerning the executed business. The general regulations under the Commodity Exchange Act (CEA) dictate that brokers must make a confirmation statement in written form one business day, at the latest, after a transaction in commodity futures or commodity options, including any foreign futures and foreign options. The futures commission merchant (FCM) has to issue a confirmation of each commodity futures transaction to the commodity customer, which will be executed by the commodity futures contract. To each option customer, the merchant has to write a confirmation statement of the commodity option transaction that must contain (1) the account identification number of the option customer; (2) a separate listing of the actual amount of the premium, each mark-up thereon, if applicable, and all other commissions, costs, fees, and other charges caused by the commodity option transaction; (3) the strike price; (4) the underlying futures contract or the underlying physical commodity; (5) the final exercise date of the purchased or sold commodity option (see http://www.cftc.gov); and (6) the date of execution of the commodity option transaction. In case of expiration or exercise of an option, the option customer has to receive a confirmation statement that documents the date of

expiration or exercise of the option. In the instance of a commodity futures or commodity option transaction caused to be executed for a commodity pool, the merchant only has to issue a confirmation statement to the commodity pool operator (CPO) (17CFR1.33(b), 2007).

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Contango

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When a near-month futures contract is trading at a discount to more distant contracts, we say that a commodity futures curve is in "contango." The converse is "backwardation." When commodities are not in a situation of scarcity, the maximum price difference between the front and back contracts tends to be determined by carrying charges, which include storage costs, insurance, and interest, discuss Till and Eagleeye (2006). This difference is the amount by which the curve is in contango.

A commodity market that is in contango is frequently referred to as a carry market. In a carry market, the futures market is providing a return for carrying inventories forward because the futures price is trading at a premium to the spot price, explains Till (2007). However, for a commodity investor the situation is the opposite. In a contango market, the investor in effects pays for the storage costs of the commodity by continuously locking in losses from futures contracts converging to a lower spot price. Correspondingly, a bond investor might liken this scenario to one of earning negative carry.

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Contract Grades

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The contract grade is the quality of a physical asset such as a commodity or of a financial instrument that must be fulfilled at the delivery when a future contract is executed. Contract grades are usually specified by the stock exchange. In commodity contracts, several acceptable grades of a commodity may be allowed for delivery. For instance, on the Chicago Board of Trade (CBOT), deliverable grades for wheat futures are no. 2 soft red winter, no. 2 hard red winter, no. 2 dark northern spring, and no. 2 northern spring at par; no. 1 soft red winter, no. 1 hard red winter, no. 1 dark northern spring, and

no. 1 northern spring at 3 cents per bushel over contract price (http://www.cbot.com). In financial futures, the contract must indicate which financial assets are deliverable. For a 10-year U.S. Treasury note futures traded on the CBOT, deliverable assets are U.S. Treasury notes maturing at least six and a half years, but not more than 10 years, from the first day of the delivery month. A conversion factor is described as the price of the delivered note ($1 par value) to yield 6%. It is used to compute the delivery price of the chosen U.S. Treasury note (the invoice price equals the futures settlement price times a conversion factor plus accrued interest). At the delivery time, the seller will probably select that grade which minimizes its delivery costs. This grade is also called the cheapest to deliver.

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Contract Market

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A contract market is an exchange or board of trade on which a futures contract is traded. For example, the Chicago Mercantile Exchange is a contract market for S&P500 Index options and futures contracts. The designation of contract markets is conducted by the Commodity Futures Trading Commission (CFTC) under the Commodity Exchange Act (CEA). In order to be designated, a contract market must meet certain requirements about their location, exchange operations, agricultural cooperatives, public interest, economic purpose test, and so on. A commodity exchange must receive a separate designation for each type of contract traded. Certain transactions in the contract market may only be effected between members, the seats of which are traded in an active market like other assets. Each commodity trades in a designated pit and futures contract trade by a system of open outcry. In this system, a trader must make an offer to buy or sell to all other traders present in the pit. A designated contract market is required to file with the CFTC their rules, bylaws, and all the changes made therein. The CFTC then reviews the exchange rules and may affirmatively approve them. In addition, a contract market must carry out a number of duties associated with required filings, terms of delivery, warehouses, enforcement programs, and arbitration procedures. Finally, a contract market is required to disseminate the trading information (including prices and volume) to the public in a timely manner.

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Contract Month

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Contract month, also called delivery month among market participants, is the month during which a futures contract expires, and during which delivery may take place according to the specific terms of the related contract. Therefore, it is the month in which a given futures contracts may be satisfied by making or accepting a cash payment or a physical delivery, that is, the action by which an underlying stock, or basket of stocks, bonds, commodity, or other securities underlying the contract is tendered and received by the contract holder (see Duffie, 1989; Hull, 2005).

Futures exchanges specify the precise period during the month when delivery can be made. For instance, futures on DJ Eurostoxx 50 traded on Eurex in Frankfurt have delivery month in March, June, September, and December.

The contract month is an important attribute of a future contract because it affects its trading volumes and hence its liquidity. As a general rule, futures contracts close to their contract month tend to exhibit greater liquidity, compared with long-maturity contracts. Hence, to limit market impact (associated to liquidity), hedgers and other investors following dynamic asset allocation strategies may be prone to use short-maturity contracts and roll them forward as the maturity of the hedge or the horizon of the strategy approaches.

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Contract Size

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The contract size is the number of units of the underlying asset that is delivered when forward and futures contracts are executed or that is purchased or sold when option contracts are exercised. While forward contract sizes are freely arranged by contractors, exchange-traded derivatives have standardized sizes. For instance, the trade unit is 5000 bushels for corn and wheat futures and one U.S. Treasury note having a face value at maturity of $100,000 for 10-year U.S. Treasury futures on the Chicago Board of Trade, 40,000 pounds of Grade AA butter, 62,500 British sterling pounds, 125,000 Euros, and $250 times the Standard & Poor's 500 Stock Price Index on the Chicago Mercantile Exchange. The standard quantity is usually 100 shares for stock options. Contract size is an important decision. On one hand, if it is too small, speculators will find it costlier to trade because trading on a large number of contracts involve high costs. On the other hand, since contracts are not divisible, if the size is too large, hedgers may be unable to get a matching number of contracts for their exposure (Chance, 1998). Some futures contracts have a quantity option that allows the seller to deliver an amount that slightly

deviates from the requirement. This prevents deliveries being refused for small departures (Ritchken, 1996).

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Convergence

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As a commodity futures contract approaches its expiration date, the futures price converges toward the expected future spot price. Commercial producers (consumers) are uncertain of future spot prices so wish to hedge against the risk of a price drop (rise) by selling (buying) futures. As the time to expiration of the futures contract draws near, the uncertainty of the expected future spot price diminishes, hence the risk premium embedded in the futures contract disappears. Figure 1 demonstrates the relationship between the spot price, expected future spot price, and the futures price. In this example, there are more commercial producers than commercial consumers hedging as in Keynes's theory of normal backwardation. Producers want to hedge against a future spot price drop by selling futures, while investors want to earn a risk premium by buying the futures at a lower price than the future expected spot price. At time *t*, today, the spot price is \$30, the expected future spot price is \$27, and the futures price is \$25. As time *T*, the expiration date, approaches, the futures price converges toward the spot price because uncertainty diminishes.

Gunzberg and Kaplan (2007) demonstrate another way to view convergence, by showing the net hedging pressure on futures prices in Figure 2. Similar to the prior example, the line labeled "normal backwardation" represents the case where there are net short hedgers or where commercial producer hedging outweighs commercial consumer hedging. The speculators get paid a risk premium for bearing the risk of future price uncertainty on the long side that forces the futures price to be less than the expected future spot price.

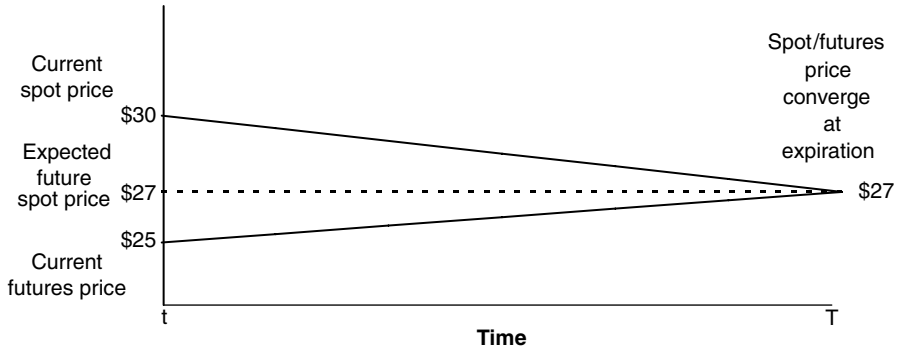

FIGURE 1
Futures and spot returns. (Adapted from Gorton and Rouwenhorst, 2006.)

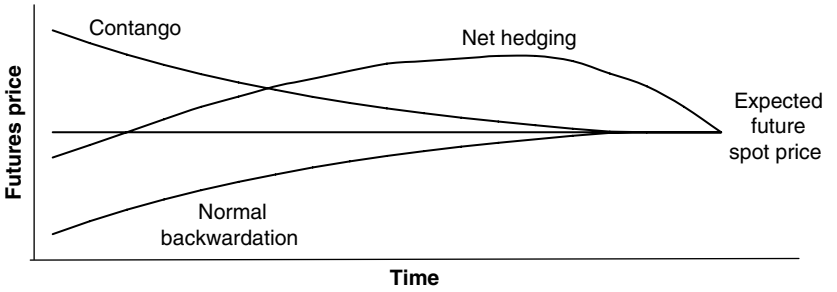

FIGURE 2
Futures price patterns.

Again, as time to expiration approaches, the risk premium diminishes and the futures price converges to the expected spot price. Likewise, the line labeled "contango" is the opposite situation where there are net long hedgers or where commercial consumer hedging outweighs commercial producer hedging. The short speculators get paid a risk premium for that forces the futures price to be more than the expected future spot price until the expiration date approaches and the futures price is forced to converge to the expected spot price.

Lastly, the curve labeled "net hedging" shows how futures prices behave through time as net hedging pressure changes. Early on, more commercial producers are hedging against a price drop, forcing the curve into normal backwardation; however, as time passes, commercial consumers get ready to purchase and therefore buy futures to hedge against a price increase. As commercial consumer hedging surpasses commercial producer hedging, otherwise known as net long hedging pressure, the futures curve is forced into contango and the price will fall to converge to the expected spot price at expiration.

Finally, a distinctly different concept that explains convergence of a futures price toward the spot price has to do with the convenience yield versus the opportunity cost of storage. It has no direct relationship with net hedging pressure and measures the benefit of holding inventory per marginal unit versus the cost of storage plus the forgone interest from the cash proceeds of a future sale. The relationship in a perfect market can be quantified by the equation: $F_{0,t} = S_0(1 + C)$ as discussed by Kolb (1999). As time to expiration nears, the cost of carry approaches zero and the futures price converges to the spot price.

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Conversion Factors

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The conversion factor is a mechanism for adjusting different prices or quantities as a means to guarantee comparability. In the

bond futures market, the objective of conversion factors is to make different deliverable bonds comparable, because most of the bonds do not correspond exactly in form to their underlyings.

Consider the examples of U.S. Treasury bond futures (traded on the Chicago Board of Trade [CBOT]), Bund or Bobl futures (traded on the EUREX), or long gilt (traded on the London International Financial Futures Exchange [LIFFE]). The seller of the futures, that is, the holder of the short position at delivery day, can choose any bond to fulfill the delivery commitment (Fabozzi, 1998; Hull, 2003; Chance and Brooks, 2007). Because deliverable bonds normally have different maturities and different coupons, the conversion factor can level out any existing discrepancies. The conversion factor thus defines the price received by the holder of the short position. The quoted price of delivery is the product of the conversion factor times the quoted futures price (Hull, 2003).

For another example, consider the conversion factor for a bond at the EUREX. It is assumed that the return level at the capital market equals 6% on delivery day. This enables EUREX to produce comprehensive tables, and the conversion factor is thus based on the present value method. By including the compound interest effect, we can define the equation to calculate the conversion factor (CF) or the price of the delivered bond, respectively, as follows:

$$\mathrm{CF} = \frac{1}{1.06^{f}}\left[\frac{c}{6}\left(1.06 - \frac{1}{1.06^{n}}\right) + \frac{1}{1.06^{n}}\right] - \frac{c(1-f)}{100}$$

where f describes the full months until the next coupon payment divided by 12 (if $f = 0$, $n = n - 1$ and $f = 1$), c denotes the nominal interest rate of the bond, and n equals the full years until bond maturity. However, the yield on which the conversion factor is based varies, for example, it is 8% for the CBOT U.S. Treasury bond or note, and 7% for the LIFFE long gilt. To determine the most favorable bond, investors must distinguish between the profits from selling the available bonds, and those from delivery in the bond futures contract. The bond offering the highest advantage at delivery is called the cheapest-to-deliver bond (CTD) (Fabozzi, 2001).

There are many factors to consider, however, in determining the cheapest-to-deliver bond. For example, if yields are in excess of (less than) 6%, the conversion factor system tends to favor the delivery of low-coupon (high-coupon), long-maturity (short-maturity) bonds. Also, when the yield is upward- (downward-) sloping, bonds with a long (short) time to maturity tend to be delivered. Furthermore, low-coupon bonds and those where coupons can be stripped from the bond tend to sell for more than their theoretical value. These bonds consequently cannot be the cheapest to deliver (Hull, 2003).

The term conversion factor is used similarly for quanto options. While quanto options exhibit all the features of standard options, they pay off at a fixed currency conversion factor. Thus, a GBP-denominated option on the underlying crude oil, which is paying in USD, would have a fixed GBP-to-USD exchange rate. Conversion factors are also used to convert units of measurement in the commodity market, such as bushels (short tons) into metric

tons or bales (for example, 5000 bushels of wheat corresponds to 136 metric tons).

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Convertible Arbitrage

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Convertible arbitrage is a nondirectional investment strategy that aims at taking profit from mispriced convertible securities. To understand how this strategy works, let us simply represent a convertible bond as a package made of two instruments: a regular bond and an option to convert this bond into some shares. For the sake of simplicity, we will assume that the convertible bond is cheap compared to its fair value and that this underpricing comes from the option component—because it is the most difficult component to value. At its most basic level, convertible arbitrage consists in taking a long position in the undervalued convertible bond and simultaneously hedging its associated risks using adequate financial instruments. Provided the hedge is adjusted adequately, this position guarantees its holder an arbitrage profit—this profit will be monetized at the latest at the maturity of the convertible bond.

In practice, a long position in the convertible bond carries a series of risks:

- Interest rate risk, due to the fixed income nature of the convertible bond. Most arbitrageurs tend not to be interested in interest rates and hedge the exposure using interest rate futures or swaps.
- Equity risk, due to the equity conversion possibility. This risk can easily be reduced by delta hedging the option embedded in the convertible bond, as suggested by Black and Scholes (1973).
- Credit risk, as the convertible issuer may default and not fulfill his/her obligations. Since arbitrageurs own the convertible bond, they are naturally long credit. They can hedge this risk using credit derivatives and in particular credit default swaps.
- Volatility risk, due to the optional nature of the convertible bond. Since arbitrageurs own the option, they are naturally long volatility. They can hedge this risk by selling volatility, for instance by selling options on the same underlying stock or by using volatility derivatives (e.g., variance swaps).
- Gamma risk (also called convexity risk), due to the mismatch between the nonlinear payoff of the convertible bond and the linear payoff of the delta hedge. Arbitrageurs can hedge this risk by selling an adequate portion of assets that are also volatility sensitive (e.g., options).

Over the recent years, many convertible arbitrageurs have shifted away from

the original "full hedge" model to adopt a higher risk profile — they now trade around their credit, volatility and gamma exposures. As a result, convertible arbitrageurs form a very heterogeneous group: some are credit traders, some are volatility traders, and some are gamma traders. There are even some multistrategy convertible arbitrageurs that trade all these parameters opportunistically. This evolution has been facilitated by the phenomenal development of credit derivatives (callable asset swaps, default swaps, and credit-linked notes) that enable arbitrageurs to gain exposure in a simple manner to the pure credit constituent of a given convertible bond.

Historically, convertible arbitrage has delivered steady returns with a low volatility. In addition to the arbitrage profit, the strategy benefited from a nice positive carry as arbitrageurs were receiving the coupon payment from the convertible bond plus the interest on the proceeds from their stock sale. However, the original success has waned and performance declined in the early 2000s. Interest rates went down, the underlying deal flow became rather limited, and too many hedge funds were chasing and competing for the same opportunities. Today, most of the convertible arbitrage deal flow is still hedge fund related—hedge funds represent more than half of the secondary market trading in convertible securities and more than 75% of the primary issues (Lian, 2006).

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Core Principle

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Core principles are provisions of the Commodity Exchange Act (CEA). Designated contract markets, derivatives transaction execution facilities, and derivatives clearing organizations have to obey these principles at registration and on a continuing basis. The core principles arose from a regulatory relief and amendment of the CEA, which was released as the Commodity Futures Modernization Act (CFMA) in 2000. The Act established alternative regulatory structures to remove unnecessary regulatory burden and to make domestic exchanges more competitive with exchanges abroad and over-the-counter markets. Before the Act was amended, the Commodity Futures Trading Commission (CFTC) announced relatively rigid rules for exchanges. Afterward it started acting as an oversight agency with the more flexible core principles (Parkinson, 2000). Since then, the core principles have been an instrument for effective self-regulation of trading facilities, clearing systems, and market participants.

A regulation based on core principles maintains the oversight of markets and clearing organizations and ensures prevention of price manipulations, integrity of all market transactions corresponding to the CFMA, and the protection of investors from fraudulent misuse of sales practices, while providing flexibility to respond to future developments. By means of the core principles, rapid adaptations of the regulations to the evolution of markets, including the introduction of new products, are

possible. The CFTC proposes amendments to guidance on core principles in response to administrative experiences and requests comments to continuously update the regulations (see http://www.cftc.gov, retrived July 18, 2007).

The CFTC provides additional interpretation and guidance on compliance with core principles and additionally acceptable practices meeting the requirements of the core principles. An applicant (or an already registered body) for a designated contract market, derivatives transaction execution facility, or a clearing organization has to demonstrate the compliance with the core principles by means of documentation or explanations, if it is not already self-explanatory that the applicant (or the already registered body) obeys the core principles. If the CFTC determines a violation of the core principles, the violators have 30 days after receipt of a notification to bring themselves into compliance with the core principles (7 USC 7a-2).

TABLE 1

Summary of Core Principles

Designated Contract Markets				**Derivatives Transaction Execution Facilities**		**Derivatives Clearing Organization**			
1	In general	10	Trade information	1	In general	A	In general	J	Reporting
2	Compliance with rules	11	Financial integrity of contracts	2	Compliance with rules	B	Financial resources	K	Recordkeeping
3	Contracts not readily subject to manipulation	12	Protection of market participants	3	Monitoring of trading	C	Participant and product eligibility	L	Public information
4	Monitoring of trading	13	Dispute resolution	4	Disclosure of general information	D	Risk management	M	Information sharing
5	Position limitations or accountability	14	Governance fitness standards	5	Daily publication of trading information	E	Settlement procedures	N	Antitrust considerations
6	Emergency authority	15	Conflicts of interest	6	Fitness standards	F	Treatment of funds		
7	Availability of general information	16	Composition of boards of mutually owned contract markets	7	Conflicts of interest	G	Default rules and procedures		
8	Daily publication of trading information	17	Recordkeeping	8	Recordkeeping	H	Rule enforcement		
9	Execution of transactions	18	Antitrust considerations	9	Antitrust considerations	I	System safeguards		

There are 18 core principles for designated contract markets, 9 core principles for derivatives transaction execution facilities, and 14 core principles for derivatives clearing organizations (7 USC 7, 7a, 7a-1). Table 1 summarizes the core principles.

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Corn Market

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Corn is used as feed grain (e.g., hog-corn-spread) in the food industry (starch, sweeteners, alcohol, margarine). Corn is a very robust plant and is cultivated globally (Rogers, 2004; Spurga, 2006). Corn is increasingly used for ethanol production in order to replace crude oil as a fuel. On the supplier side we see an annual production of about 600 million tons (38% USA, 20% China, 8% Brazil, 7% EU), corresponding to a demand in the same magnitude of order (USA 32%, China 20%, Brazil, 6%, Mexico 5%). Since most of the big supplier countries also act as consumers, only a small part of global production is available for the global market; therefore regional trading dominates.

As for all agricultural commodities, the total harvest depends on the weather and especially on the water supply. Genetically engineered corn is widely adopted, at least in the United States. Corn is traded on several exchanges, for example, CBOT. Future contracts refer to a delivery of 5000 bushels; the tick size for a contract is 12.50 USD, corresponding to 1/4 cent per bushel. The daily price limit is 50 cent per bushel. Deliveries end at the second exchange trading day after the last trading day of the delivery month.

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Cornish-Fisher Value-at-Risk

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Common models to evaluate the value at risk (VaR) are the variance-covariance model, historical simulation, and Monte Carlo simulation. Based on the variance-covariance model, the VaR can be enhanced to the Cornish-Fisher value at risk ($\mathrm{VaR}_i^{\mathrm{CF}}$). The traditional variance-covariance VaR estimates the maximum loss of an asset for a given investment horizon, at a specified significance level α and under normal market conditions. The VaR of asset i can be evaluated as follows:

$$\mathrm{VaR}_i = E(R_i) - z_c \sigma_i$$

where $E(R_i)$ is the expected return, σ_i the expected volatility, and z_c the $1-\alpha$ quantile of the standard normal distribution. To analyze

the loss potential in the area of α the conditional value at risk can be used (Rockafellar and Uryasev, 2000).

As hedge funds tend to be not normal distributed (often positive excess kurtosis and negative skewness) a traditional VaR would underestimate the risk. Hence, adjustments regarding skewness and kurtosis were implemented into the variance-covariance VaR model by Mina and Ulmer (1999) and Favre and Galeano (2002). The Cornish-Fisher expansion is used to adjust the z_c of the traditional VaR so that

$$z_{CF} = z_c + \frac{1}{6}(z_c^2 - 1)S + \frac{1}{24}(z_c^3 - 3z_c)K - \frac{1}{36}(2z_c^2 - 5z_c)S^2$$

with skewness S and excess kurtosis K.

Analytically the VaR_i^{CF}, which is also known as modified value at risk, of asset i is

$$\mathrm{VaR}_i^{CF} = E(R_i) - z_{CF}\sigma_i$$

In case of slight deviation from normal distribution, the (VaR_i^{CF}) generates more accurate results compared to the traditional VaR. But the precondition of normal distribution is only adjusted and not replaced. If the distribution deviates strongly from normality then the extreme value theory provides better results (Lhabitant, 2004).

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Cornish-Fisher Value-at-Risk for Portfolio Optimization

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The normal parametric value-at-risk (VaR) approach assumes that returns follow a normal distribution and the standard deviation is the sole risk factor affecting the downside risk measure. However, this approach is not applicable to data exhibiting fat tails measured by excess kurtosis and asymmetric returns measured by skewness as Signer and Favre (2002) show. The Cornish-Fisher (CF) VaR, which is based on the Cornish-Fisher expansion, captures the extreme tail and the asymmetry of hedge fund returns by incorporating more parameters characterizing the distribution of returns. The basic idea behind the approach is to obtain quintiles of the empirical distribution using analytical approximations, which take into account the first four estimated moments of the distribution. The CF approximation is a Taylor-series like expansion that adjusts the critical value $z(\alpha)$ of the normal parametric VaR for skewness and kurtosis of the empirical distribution and is given by

$$\mathrm{VaR}^{CF} = \mu + \Omega(\alpha)\sigma$$

$$\Omega(\alpha) = z(\alpha) + \frac{1}{6}(z(\alpha)^2 - 1)S + \frac{1}{24}(z(\alpha)^3 - 3z(\alpha))K - \frac{1}{36}(2z(\alpha)^3 - 5z(\alpha))S^2$$

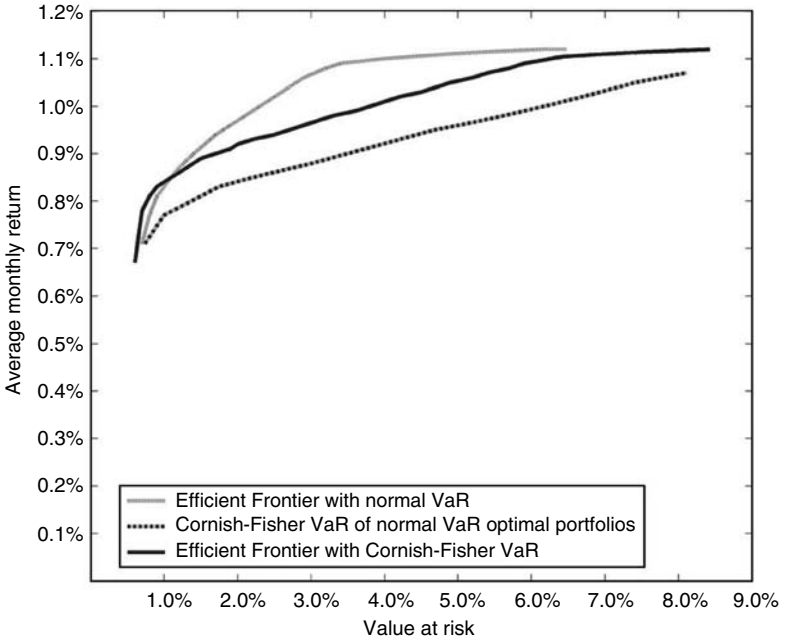

FIGURE 1
Value-at-risk efficient frontiers.

where μ and σ are, respectively, the sample mean and standard deviation, S is the skewness and K is the excess kurtosis of the return distribution, and $\Omega(\alpha)$ is the modified critical value in the VaR calculation in order to take account of skewness and kurtosis. Both VaR models—the parametric and the Cornish-Fisher VaR—can be used as risk measure for the following portfolio optimization as Favre and Galeano (2002) show:

$$\text{Minimize } \text{VaR}^{\text{CF}}$$

$$\text{Subject to} \quad \sum_{i=1}^{N} x_i \mu_i = \mu_{\text{PF}}$$

$$\sum_{i=1}^{N} x_i = 1 \quad \text{and} \quad x_i \geqslant 0$$

Figure 1 displays the efficient frontiers for the portfolio optimizations of hedge fund returns with the normal VaR (dotted line) and with the Cornish-Fisher VaR (solid line). The dashed line, which displays the actual Cornish-Fisher VaR of the normal VaR optimal portfolios from the efficient frontier with the normal VaR, clearly shows that the parametric VaR underestimates the true portfolio risk and an optimization with the Cornish-Fisher VaR provides better portfolios on a risk-adjusted basis. Additionally, Schwindler (2006) shows that the CF-VaR provides more accurate VaR predictions than the normal parametric VaR.

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Corporate Structure Arbitrage

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A corporate structure arbitrage trade is a type of relative value trade in equities, which are related by parent/subsidiary relationships or cross-shareholdings. This is also known as holding company arbitrage. Often, parent/subsidiary relationships between two listed shares can be difficult to unravel, but situations can arise where the market value of a parent trades at an effective discount to the value of its equity stake in the subsidiary. This is only economically rational if the parent company's operating businesses have negative value. Since this is often not the case, this could represent an opportunity to buy the parent and sell its subsidiary in equivalent values. If the wider market subsequently becomes aware of the discrepancy, the discount should narrow or disappear.

A more aggressive variant of this strategy is to buy out the parent company entirely and then sell the listed subsidiaries on the open market, and any unlisted operating businesses to private buyers. This requires more initial capital than most investors have access to and takes longer to unwind than many can stomach. The limited number of large players and the often deliberately obscure nature of holding company structures mean that more of these situations arise and persist than many would expect.

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Corporate Venture Capital

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Corporate venture capital is a term used to describe direct investments in entities that are in the initial—or better still—start-up phases of an economic initiative. Large-scale companies normally undertake such investments. Primarily, the goal that drives these institutions is a strategic one, aimed at financing companies or projects that may later become targets for M&As. However, one may find players who, like traditional venture capital investors, are prompted to invest for the sole purpose of remuneration on the capital they invest; in other words, they seek high returns.

What must be underscored, in particular when the investor's aim is a strategic and nonfinancial one, is that the degree of interconnection between the businesses of the two participants in the deal is quite obvious. In other words, unlike traditional venture capital, in corporate venture capital there is a complementarity between the interested parties. On one hand, this confirms how careful and focused the investor's selection process is, and on the other clarifies the actual competitive advantage and/or value-creating driver of these ventures.

The approach of a corporate venture capitalist can be summed up in four ways:

- Driving investment. This category includes any investment involving a strategic driver. In addition, there is a clear, direct link between the core business of the financing company and the financed company, so much so that the success of the former is inextricably linked to the performance of the latter.
- Enabling investment. Here one finds deals in which strategic rationale is essential to the decision to finance, but there is no link between the performance of the supplier and the recipient of the financing.
- Emergent investment. A firm makes these types of investments in start-ups that have close links to its operating capabilities but provides little to improve the firm's current strategy.
- Passive investment. In this type of VC investment, the ventures are not associated to the firm's own strategy and are only loosely connected to the firm's operational capabilities.

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Correlation Coefficient

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A correlation coefficient measures the degree to which two variables, X and Y, affect each other. In finance, it measures how two investments (securities) move relative to each other (Feibel, 2003; Luenberger, 1998). However, the correlation coefficient detects only linear relationships between two variables.

The correlation coefficient between two variables, X and Y is

$$r = \frac{\sum (X - \overline{X})(Y - \overline{Y})}{\sqrt{\sum (X - \overline{X})^2 (Y - \overline{Y})^2}}$$

where $\overline{X}$ and $\overline{Y}$ represent the mean values of n observations of X and Y, respectively.

Note that the above coefficient is known as the Pearson correlation coefficient, and it is the best estimate of the correlation of X and Y (when both X and Y are normally distributed) (Higgins, 2004; Keller and Warrack, 2003; Luenberger, 1998; StatSoft, Inc., 2007). It is the most commonly used coefficient in practical applications.

The value or r is between -1 and $+1$. If r is less than 0, X and Y are inversely related, that is, when the value of one increases then the value of the second variable tends to decrease, and vice versa. If r is positive, then the two variables move in the same direction, that is, when one variable increases, the other one also tends to increase and vice versa. If r is 0 or close to 0, then the two variables are

not correlated. This means that there is no straight relationship between the two variables. A change in the value of one variable does not give any indication about how the other variable will move. If r is equal to −1, the two variables always move in opposite directions and if r is equal to +1, then the two variables always move in the same direction.

However in the real world of finance it is unlikely that two investments (securities) are perfectly correlated (correlation coefficient equal to −1 or +1). Instead, we will talk about degree of correlation depending on the value of the correlation coefficient. Moreover, the interpretation of the correlation coefficient depends a great deal on the context in which it is used. The Pearson correlation indicates the strength of a linear relationship between two variables (Higgins, 2004; Keller and Warrack, 2003; StatSoft, Inc., 2007). Therefore, its value alone may not be sufficient to evaluate this relationship (especially when the variables are not normally distributed). Finally, it is important to know that one must be very careful in interpreting correlation coefficients because even if two variables are highly correlated, it does not necessarily mean that one affects the other. In other words, correlation does not imply causation.

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Cost, Insurance, and Freight (CIF)

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Cost, insurance, and freight is one of the so-called International Commercial Terms (Incoterms). The Incoterms are specified contractual terms in foreign trade and were first published by the International Chamber of Commerce in Paris in 1936. The Incoterms are clauses that can be included in foreign trade contracts to describe which part of transportation cost the seller of the goods has to pay and which part of transportation risk he bears or accounts for. The Incoterms do not regulate when the legal ownership of the goods pass over from vendor to the acquirer.

Cost, insurance, and freight means that the vendor has to bear the whole transportation cost including shipping to the port of destination and the cost of the marine insurance. Contrawise the vendor has only to take account for the transportation risk until the good passes the ship's rail. Current guidelines for Incoterms are available from the International Chamber of Commerce (2000a, 2000b).

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Cost of Tender

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In financial markets to tender is to give notice, to the exchange's clearing house, of the purpose to begin delivery of the physical commodity in approval of the futures contract. Almost all investors who invest in commodity futures choose to close their positions before expiration and not to physically deliver the underlying. This way they still benefit from an eventually favorable movement in the underlying commodity price, but avoid having to go through the (rather complex) process of actual delivery.

Nonetheless, a commodity futures contract establishes rules on how to access the quality of the delivered commodities, where a delivery can take place, and under exactly what conditions.

The cost of tender is the total charges that relate to the delivery and certification of commodities underlying a futures contract. Charges are, typically, due to official warehouses where certification and delivery take place and, sometimes, also due to the clearing house. They vary across warehouses and exchanges have no obligation to impose limits. Most of the times, however, exchanges do report on their websites the costs charged by their official warehouses. More rarely they establish an exact cost in the futures' contract. This is the case, however, of the Euronext-Liffe Exchange cocoa futures contract that says "bulk delivery units are tenderable at a discount of £20 per tonne to the contract price."

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Cotton Market

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Cotton is a soft fiber that is used in textile industry. The cotton plant grows in subtropical climate zones (Spurga, 2006). The plant requires sunshine and water during the growth period; however, during harvest (September to December) dry weather is preferred. The consumption of cotton has shifted to the developing countries largely as a result of increasing wage levels in developed countries. This is one factor that has led to a rather active trading market: Since 1960 roughly one-third of cotton production has been traded per annum (Table 1).

Cotton is traded on exchanges: New York Cotton Exchange (NYBOT, formerly NYCE), New Orleans (both United States), Liverpool (United Kingdom), Alexandria (Egypt), and Bremen (Germany). Contract size at the NYBOT is 50,000 lbs with a tick size of 1/100 cent per lbs, that is, 5 USD per contract (NYBOT, 2004). The daily price limit is 3 cent per lbs. Delivery takes place at every trading day of the contract month. Benoit Mandelbrot used the long-time history of cotton prices for his research about volatile markets (Mandelbrot and Hudson, 2005).

TABLE 1

Top Producers and Consumers

Rank	Top Five Producers (in ,000 tonnes)		Top Five Consumers (in ,000 tonnes)	
1	China	4,871	China	7,000
2	United States	3,975	India	2,950
3	India	3,009	Pakistan	2,100
4	Pakistan	1,734	United States	1,413
5	Brazil	1,309	Turkey	1,350

Source: The Economist, World in Figures 2006, Profile Books Ltd.

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Counterparty Risk

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When two investors get in touch with one another and agree a future purchase or sale (a call or put option) on an asset at a specific price, they both assume a degree of risk. One of the investors may regret having accepted the operation and not fulfill the agreed conditions, or may simply not have sufficient funds to meet the obligations. In this sense, counterparty risk is the risk to each party of a contract that the counterparty will not live up to its contractual obligations (in the case of an option this risk is taken on solely by the holder of the option). In the forward contracts this risk is taken on by both parties. However, in the options and futures markets, the exchange clearing house acts as an intermediary or middleman in all the operations, thereby eliminating the risk for its clients (Hull, 1997; Poitras, 2002). The exchange clearing house neutralizes the risk by requiring clients to deposit funds in what is known as a margin account. The amount of money that must be deposited varies from asset to asset and between one investor and another. The exchange clearing house reconciles the deposits established by the different participants in the market on a daily basis so that this guarantee remains unalterable. This process is known as marking-to-market.

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Covenants

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Covenants are legally binding promises made to investors, usefully by borrowers to lenders. The agreement between lender and

borrower is called an indenture. The indenture lists responsibilities for the borrower to make periodic interest payments and to repay principal as well as to protect and preserve assets. Covenants are specific provisions included in the indenture to protect the borrower or reduce the risk of default.

In many cases, equity holders and bondholders have conflicting interests. Further, managers of most companies are equity holders. Without protective covenants, the managers and directors would be able to make decisions adverse to the bondholder. For example, a company may dramatically increase its debt load. New debtholders can demand a higher return to compensate for the increased risk of default. In the absence of protective covenants, existing bondholders can be harmed by this increased leverage, if a change in capital structure forces the value of existing bonds lower.

Equity holders and managers may also benefit from the presence of restrictive covenants. In the absence of covenants, bond yields must compensate lenders for potential risks that are permitted. When a company issues a bond with fair and sound covenants, lenders need only to demand compensation for risks that are present, not risks that might occur if management makes changes in policy that increase the chance of default.

Many types of covenants are negative covenants. Covenants may limit the ability of a corporation to pay out cash to shareholders as dividends or return of capital. Negative covenants may limit the amount of leverage in the capital structure. Indentures frequently contain covenants that restrict the ability of a company to issue more senior debt. Covenants may limit the actions of current or potential new owners in merger or divestiture.

While negative covenants limit the actions of the company, other covenants require a company to take positive actions that serve to reduce the risk of default. Covenants may require a company to maintain adequate liquid assets to reduce the risk of cash shortfall. Companies may be required to have adequate insurance for a variety of business risks. Covenants may require the borrower to invest in the upkeep of assets.

Covenants in existing indentures can become overly restrictive as business conditions and corporate strategies change. Companies cannot unilaterally change covenants in outstanding indentures but lenders can agree to make changes to covenants. Sometimes, lenders will make minor changes when the changes don't materially affect the risk of default. Other times, a bondholder may agree to eliminate or relax covenants if the change permits profitable growth, which indirectly reduces the risk of default. Sometimes, a borrower will ask other borrowers to relax or eliminate covenants in return for a higher coupon or to tighten a different covenant that reduces the risk to the borrower.

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Covenants (Venture Capital and Private Equity Context)

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Covenants, in the private equity and venture capital context, are key contract

stipulations that bind a firm and restrict its actions. A covenant is a general legal term for a signed, written agreement binding two or more parties. Private equity firms (and venture capital firms, a subset of this industry focused on high growth opportunities) are governed by long-term contracts, both when they raise money from their capital suppliers and when they invest in promising business opportunities. To raise capital, private equity firms form a partnership and act as the general partner, obtaining funds from limited partners, typically wealthy individuals and institutional investors such as pension funds. These investors monitor the funds' progress but they cannot take decisions; in this way they maintain their limited liability status. Given that the investors must remain passive, the contract imposes certain restrictions on the private equity firm, such as not allowing the firm to commit too much capital to any one sector or to any particular investment. These restrictions are known within the industry as covenants.

In an empirical study, Gompers and Lerner (1996) examined 140 venture capital partnership agreements in the United States and determined that these contracts were fairly heterogeneous in their inclusion of covenants. These authors also examined and found support for two complementary explanations for the use of covenants. First, covenants exist to prevent agency problems where one party—the private equity firm—acts as an agent on behalf of the investor; here covenants restrict the firm's actions to ensure that actions are not taken that advance the interest of the firm at the expense of the investors. Empirical evidence showed that investment situations with greater potential to encounter such conflicts led to more restrictive covenants. Second, their study also confirmed that covenants reflect the general supply and demand conditions in the industry; when funds are readily available, venture capital firms are able to negotiate better contractual terms with fewer covenants. More recently Cumming and Johan (2006) studied covenants of 50 private equity contracts in 17 different countries. These authors update and expand a typology of covenants established by Gompers and Lerner (1996). These authors also note that some covenants protect the fund manager by offering them limited liability in the case of disappointing returns or if they fail to invest the specified capital in the agreed-upon time. Cumming and Johan find that the extent that such covenants are used in a country depends somewhat on the local legal system, but more importantly reflects the presence of legally trained managers.

While the term covenant is more typically used to describe stipulations in limited partnership agreements, there are also covenants in venture capitalists' contracts with the companies they fund. These covenants prevent entrepreneurs from taking certain actions without the venture capitalists' approval, such as taking on debt or selling their shares until preferred shares (owned by the investors) are first paid back in full.

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Covenants (in Loans or Securities Issues)

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When a corporation or governmental entity borrows money, the obligations of the issuer and the rights of the bondholder are set forth in the debt contract. This debt contract, or bond indenture, explains the important features of the lending agreement (e.g., the principal amount, interest rate, schedule of payments, and maturity date). In addition, the bond indenture contains covenants that are designed to protect the bondholders by controlling conflicts of interest between the shareholders and the bondholders.

There are four major sources of conflict between bondholders and stockholders (Smith and Warner, 1979). First, asset substitution, or risk shifting, in which more risky projects that may benefit the stockholders are undertaken at the bondholders' expense can reduce the value of the bonds. Second, claim dilution or the issuance of additional debt with the same or higher priority claims on the firm's assets can decrease the value of the bonds. Third, underinvestment or the incentive of the stockholders to forego positive NPV projects whose benefits accrue to the bondholders can reduce the value of the bonds. Finally, the value of the bonds can be impaired if the stockholders raise the dividend rate while simultaneously reducing investment.

Debt covenants are often dichotomized into affirmative (or positive) covenants that require particular actions by the issuer and negative covenants that restrict certain actions by the issuer. Affirmative covenants are promises by the borrower to take specific actions such as keeping financial ratios within certain limits or insuring and maintaining assets. Negative covenants prohibit specific actions by the borrower by setting limitations on dividends, mergers, issuance of additional debt, asset dispositions, and other such transactions.

Debt covenants can also be grouped into five different categories by their effects on the actions of the firm (Smith and Warner, 1979). Most debt covenants either restrict the firm's production and investment choices, set the maximum allowable payout to shareholders in the form of dividends or share repurchases, restrict the firm's issuance of other fixed obligations, require certain bonding activities by the issuer, or specify the pattern of payments to the bondholders.

Restrictions on the firm's production and investment decisions are usually used to control the asset substitution problem. Such covenants restrict the firm's investments in the securities of other companies, place restrictions on the disposition of firm assets, restrict the firm from engaging in mergers (unless certain conditions are met), and require the maintenance of firm assets. A recent innovation has been the use of event-risk covenants (Malitz, 1994). These covenants are triggered by prespecified events, generally involving a change in corporate control. If a triggering event occurs, one type of event-risk covenant, the poison put, permits debtholders to sell back the securities to the firm at par value and the second type of event-risk covenant, the reset, allows debtholders to renegotiate the coupon rate.

Restrictions on dividend payments and share repurchases prevent the firm from

engaging in excessive payouts to shareholders that would reduce the value of the debtholders' claims. These covenants generally set a limit on distributions to stockholders by defining an inventory of funds available for distribution. Typically, this inventory of funds consists of future net earnings (or a proportion of such earnings) plus any proceeds from the sale of common stock plus a fixed amount (known as the dip) less any dividends paid since the debt was issued.

Restrictions on subsequent financing are generally used to control the claim dilution problem. Some covenants set limits on the issuance of new debt with higher priority or require that existing debt be upgraded to have equal priority with any new debt issued. Other covenants restrict the firm's use of rentals and leases and the use of sale-leaseback agreements on existing assets.

Covenants requiring the firm to engage in bonding activities are generally used to insure compliance with the terms of the bond indenture and safeguard corporate assets. These covenants specify the required reports that must be filed by the company (e.g., audited financial statements), specify the accounting techniques to be used in the preparation of such reports (usually GAAP), require certification of compliance with the covenants by the firm managers, and require the insurance of assets and maintenance of liability insurance coverage.

Finally, bond covenants are also used to reduce conflicts of interest by specifying the pattern of payments to bondholders. Sinking funds require that a portion of the principal be repaid (or set aside) periodically prior to maturity thereby reducing the bondholders' exposure to a decline in the value of the assets underlying the debt (Myers, 1977). Convertibility provisions allow the bondholder to exchange the debt for other company securities (usually common stock) while callability provisions allow the company to redeem the debt prior to maturity at a stated price.

The covenants most often found in bond indentures are the call provision (which is most commonly exercisable after 10 years), sinking fund provisions, the negative pledge (which limits the amount of assets that can be used as security in future debt issues), and prohibitions on sale-leasebacks (Malitz, 1994). Violation of any of the covenants included in the bond indenture results in technical default, which can lead to bankruptcy, reorganization, or renegotiation. The accounting-based covenants most frequently violated are net worth requirements, working capital requirements, leverage limitations, interest coverage requirements, and cash flow requirements (Smith, 1993). In the event of bankruptcy or reorganization, the absolute priority rule states that senior bondholders should be paid in full before subordinated creditors are paid. However, several studies have found that in reorganizations violations of absolute priority are more common than adherence to the rule (Fabozzi, 2001).

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Covered Options

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A covered option is an option that is written by the option seller with a simultaneous position on the underlying asset. This covers the risky position that can arise from the short option position.

This means that the option seller is protecting the short option position assuming a lower risky position. If the underlying asset starts rising, call options follow the move. As the underlying asset has no theoretical limit to stop, the liability associated with the short call option position has no theoretical limit too. However, having a covered position the seller of a call option will sell the underlying asset to the option holder by the exercise price whenever exercised. The potential loss from selling the underlying asset too low may seem very negative, but requires no cash outflow.

The same protection happens for put options, considering deep falls of the market. When shorting covered puts, investors are assuming a potential downside risk on the put that will be covered by a short position on the underlying stock. As the market starts falling, the put option position starts incurring losses, but the short position on the underlying stock will compensate this potential loss. It is usually easier to cover call options than put options since they require opening a short position on a stock. Options can be covered by delta hedging or other complex strategies.

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Crack Spread

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The term "crack spread" comes from cracking chains of hydrocarbons in raw crude oil into (shorter) chains that make up gasoline and heating oil (or aviation fuel). As such cracking takes part in a refinery. There, crude oil is split into gasoline and heating oil (diesel). The term "spreading" in the commodities world describes the value between a raw commodity (crude oil) and a refined commodity (gasoline and diesel) and as such the profitability of a refinery. A rising crack spread means rising profits from cracking. Given a specific split (how much units of gasoline and diesel are created from one unit of crude oil) trading the crack spread can be used to lock in the profitability of a refinery. Assuming that extra normal profits will alarm politicians as well as attract market entrants, crack spreads will show mean reverting behaviour. However, dislocations can be large and persistent if the refining capacity is limited (for example due to natural catastrophes). In order to use the crack spread for the derivation of an investment strategy Dunis et al. (2005) use nonlinear techniques to model the mean reverting behaviour of crack spreads. Their strategies achieve an information ratio of about 1 in out-of-sample testing.

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CRB Reuters

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The Reuters CRB Index (CCI) was introduced in 1957 by the Commodity Research Bureau, Inc., which itself was founded in 1934 and currently pertains to Barchart.com, Inc., and was first mentioned in the CRB Commodity Year Book in 1958. With its history, the index today is known as the oldest globally used commodity index. Initially the index comprised 28 commodities, out of which 26 were traded at the U.S. (New York, Chicago) and Canadian (Winnipeg) future exchanges. The remaining two commodities were cotton and wheat, which were traded at the spot markets in New Orleans and Minneapolis. For comparison reasons with the Daily Index of Spot Market Prices containing 22 commodities, which was released in 1940 by the Bureau of Labor Statistics and modified in 1947, the initial Reuters CRB Index was calculated back to 1947 thus marking its start year. During the initial time, for all commodities contained, the arithmetic mean over all available future prices with a remaining runtime of up to 1 year was calculated. Then the index was calculated as the unweighted geometric mean of these commodity prices. Due to the equal weighting scheme, the index was permanently rebalanced and thus was not subject to extreme price volatilities. Until it was renamed as Reuters/Jefferies CRB Index (RJ/CRB) in May 2005, the commodity weights were adjusted nine times. Hereby the commodity futures used for index calculation were limited to a remaining runtime of 9 months in 1987 and finally 6 months in 1995 (Table 1). At the same time, a commodity price was calculated using only between two and five futures (forward averaging). Independent from its index constituents, the CRB index family with its seven substrategy indices represents a constant investment volume—hence neither the withdrawal nor the inclusion of additional funds needs to be taken into account (Commodity Research Bureau, 2006).

TABLE 1

CRB Index Chronology

	1957	1961	1967	1971	1973	1974	1983	1987	1992	1995	2005
Number of futures markets	26	25	26	27	28	27	27	21	21	17	19
Number of spot markets	2	2	2	2	0	0	0	0	0	0	0
Markets in index	28	27	28	29	28	27	27	21	21	17	19
Markets removed		−1	0	−10	−1	−1	−4	−6	−1	−5	−1
Markets added		0	1	9	2	0	4	0	1	1	3
Forward averaging window (months)	12	12	12	12	12	12	12	9	9	6	Nearby rolling

Source: Index Chronology (CRB Reuters/Jefferies, 2007).

In order to permanently guarantee the representativity of the current commodity sector and simultaneously improve the liquidity as well as the economic relevance of the index, its concept was fundamentally changed with the 10th revision. The switch to the (continuous) nearby rolling method, where only one single futures contract per commodity is used for index calculation, increases the transparency, tradeability, and real replicability of the index. Future rollover takes place during the first four working days of each month, however, only if no so-called futures rollover disruption event is characterized by the following three events: (1) the relevant contracts for the commodity settle at the daily maximum or minimum price as determined by the rules for the relevant exchange, (2) the exchange fails to publish an official settlement price for the commodity, (3) the exchange on which the commodity trades is not scheduled to be open. Furthermore, the equal weights of the index constituents were abandoned and a new four-step sector approach (a tiered approach) introduced. Hence all relevant commodities are divided in four different categories. Category I covers the three main energy commodities (WTI crude oil, heating oil, and unleaded gas), which together make up a constant 33% of the index weight. Within the category the weights are determined by the actual traded volume, thus leading to 23% for crude oil and 5% for the other two, respectively. Category II covers seven highly liquid commodities with an index weight of 6% each. Category III covers four equally weighted liquid commodities with a total weight of 20%, thus 5% each. Category IV contains five commodities with 1% weight each, which add additional value to the index through diversification effects. In order to keep these weights constant, there is a rebalancing within the first 6-day work days of each month where overweighted commodities are sold and underweighted ones are bought. In addition to these monthly index revisions, the Reuters/Jefferies CRB Index Oversight Committee comprising six members nominated by Jefferies, Reuters and the Board of Trade of the city of New York, Inc., meets once a year to possibly modify the index composition and calculation and the processes included (Commodity Research Bureau, 2007).

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Credit Default Swap

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In any kind of swap two parties pay a stream of cash flows to one another during a given period of time. In a credit default swap (CDS) one party (protection buyer) pays a fixed amount of money at fixed dates while the other party (protection seller) pays back something only if a third party (reference entity) defaults.

As it happens for an insurance policy, in which a periodic premium is paid to receive a refund if a given event happens, in the CDS a periodic premium is paid to receive a refund if a credit event happens. According to the International Swaps and Derivatives

Association (ISDA—www.isda.org), six credit events exist:

1. *Bankruptcy.* It means insolvency.
2. *Obligation acceleration.* The pertinent obligation becomes due early and payable as a result of nonpayment by the reference entity.
3. *Obligation default.* The pertinent obligation becomes capable of being declared due and payable as a result of a default by the reference entity.
4. *Failure to pay.* Failure of the reference entity to make, when and where due, any payments under one or more obligations.
5. *Repudiation/moratorium.* The reference entity disaffirms, disclaims, or challenges the validity of the pertinent obligation.
6. *Restructuring.* This event considers a decrease in the principal amount or amount of interest payable as an element of the obligation, a delay in payment, an alteration in ranking by priority of payment or any other type of payment.

A calculation agent, who will decide whether a credit event has happened, is usually indicated in the swap contract.

PRICING

The elements needed for pricing a CDS are as follows:

- δ: the periodic payment made by the protection buyer (here we assume it is constant)
- R: the amount of money that the protection seller pays to the protection buyer
- $B(t, s)$: the price in t of a zero-coupon expiring in s (we assume to know the whole zero-coupon curve)
- $p(t, s)$: the (risk neutral) probability that a given credit event has not happened between t and s
- $\lambda(t)$: the default rate given by the ratio between the total number of credit events happened in t within an item population of reference entities and the number of reference entities which haven't experienced a credit event yet

If the default rate is independent of the interest rate (see, for instance, Longstaff et al., 2005; Hull and White, 2000), then the value in t_0 of a CDS for the protection buyer (who pays δ and may receive R) can be easily computed as

$$\mathrm{CDS}(t_0) = -\delta \sum_{t=t_0}^{T} B(t_0, t)p(t_0,\ t) + R\sum_{t=t_0}^{T} \lambda(t)B(t_0, t)p(t_0,\ t)$$

If the CDS is issued in t_0 then $CDS(t_0)$ must be zero (as it happens for any other swap). This means that the expected present value of the protection buyer payments must equate the expected present value of the protection seller payments. We accordingly have

$$\delta = R\frac{\sum_{t=t_0}^{T} \lambda(t)B(t_0, t)p(t_0,\ t)}{\sum_{t=t_0}^{T} B(t_0, t)p(t_0,\ t)}$$

Thus, in order to hedge against the credit risk, the protection buyer must pay a premium that is given by the product between the protection seller payment at the credit event and the weighted mean of the default rates (the weights of the mean are given by the survival probabilities discounted by the zero coupons). If the default rate is constant

(which is quite an unlike hypothesis), then we have the simplified relation:

$$\delta = R\lambda.$$

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Cross-Hedge

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Cross-hedging is a technique used to hedge or secure the future value of a position of a financial instrument (such as stocks, commodities, and bonds) through exposure to a derivative position (such as options and futures) on another financial instrument. The process occurs in this way because there are no derivatives that have underlyings identical to the financial instrument from the underlying transaction. Potential explanations can also be found, however, in the incongruity of the spot and futures markets. If, for example, (1) there are discrepancies in the maturity or the timing of the components involved in the cross-hedge, (2) the amount required and the future size available do not match, or (3) the underlying characteristics are not identical, then it will not be possible to perfectly hedge the underlying transaction (Ramesh, 2001). The risks that result from these discrepancies are referred to as cross-hedge risks.

In order to avoid market limitations to some extent, the cross-hedging strategy is based on the assumption that both the financial instrument position and the derivative position used for the hedge are related. Prices of both will (should) thus move in the same pattern. It is also possible to combine futures with different underlyings to better grasp the characteristics of the underlying transaction. The price risk of a cross-hedge generally decreases as the (future) correlation of the underlying financial instrument increases (Reilly and Brown, 2005).

Suppose an investor wants to secure the current value of a financial position. Suppose further that there are no futures, options, or other derivatives available that have the relevant financial positions for the underlying. If the price of the position falls, the investor hopes the financial derivative on the related position will compensate for the loss, due to the negative market fluctuation. An investor wishing to do a cross-hedge is therefore looking for a financial derivative with an underlying that is closely related to the financial position. In order to assess which derivative is most suitable, we need to analyze the degree of congruency of the historical price movements by using regression and correlation analyses. For the cross-hedge, we usually choose the financial derivative that minimizes the variance of the hedging position at the maturity of the underlying transaction. However, the historical analysis of the price characteristics is a necessary condition. Without sound economic justification, the future price development between the underlying and the chosen financial derivative might

differ significantly from the ex-post price development. Furthermore, the basis risk of cross-hedges usually increases above that for a direct hedge, because of the differences in elasticity of the pricing determinants of the cross-hedge's underlying. In order to minimize the cross-hedge risks, we must calculate the hedge ratio, or the correct number of contracts (for more details see also Sutcliffe, 2006).

Consider the following example. A producer wants to freeze the current market price of a commodity. Suppose we have a position of n commodity units (the underlying transaction), with a price of $p_{0,\text{Basis}}$ at time $t = 0$, to be secured against a price decline at time $t = 1$, when the producer intends to sell. Suppose there is another related commodity available with an almost identical price pattern, with the price $p_{0,\text{Cross-Hedge}}$, with futures on the substitute commodity as the underlying, and price F_0 (assuming the contract volume is 1) at time $t = 0$. The producer has three basic alternatives. First, if possible, he/she can sell the commodity at $t = 0$ and bear any resultant costs (i.e., the cost of carry, inventory costs, interest, etc.). Second, he/she can speculate that there will be a price increase. Third, he/she can do a cross-hedge, or short the futures. Given prices in $t = 1$, the cross-hedge would result in the following profit/loss per unit, if there are no commissions or transaction costs:

$$\begin{aligned}\text{profit/loss per unit} &= \text{profit/loss of the futures} + \text{profit/loss of the underlying transaction}\\ &= (F_0 - F_1) + (p_{1,\text{Basis}} - p_{0,\text{Basis}})\end{aligned}$$

By rearranging and expanding the formula with the prices of the substitute commodity, we can gain more insight into the (basis) risks involved, as follows:

$$\begin{aligned}\text{profit/loss per unit} = {} & F_0 + \underbrace{(p_{1,\text{Cross-Hedge}} - F_1)}_{\text{"direct hedge" basis risk}}\\ & + \underbrace{(p_{1,\text{Basis}} - p_{1,\text{Cross-Hedge}})}_{\text{"cross hedge" basis risk}}\\ & - p_{0,\text{Basis}}\end{aligned}$$

The above formula shows that the basis risk involved in the cross-hedge must be higher than that for the direct hedge, since it has two components: (1) the "direct hedge" basis risk, which increases along with the disparity between the standardized underlying of the futures and the underlying transaction, and (2) an additional "cross-hedge" basis risk that results from the difference between the spot prices of the two underlyings. This implies that even if the maturity of the underlying transaction is identical to the futures position, there will be an inherent additional "cross-hedge" risk. This is not necessarily, however, a disadvantage. In the case of a short/long hedge, the investor may benefit from a strengthening/weakening of the basis (see also Steward and Lynch, 1997).

The above example of a cross-hedge with futures is just one possibility for market participants. It has the advantage of low costs, because the payment profile is symmetrical. Thus neither the hedger nor the speculator faces one-sided risks. However, the hedger could also do a cross-hedge with options. For example, if the hedger wants to hedge a long position, he/she may buy put options. And because the hedger would still participate in price increases but not

in price declines, the issuer would receive a (option) premium from the hedger for bearing the one-sided risk although this makes the hedge costlier.

To summarize, the success of cross-hedges depends significantly on the quality of future price correlation forecasts, because cross-hedges are based on the similarities between future correlations of the underlyings to the derivative prices. Although the price risk declines significantly, it cannot be completely eliminated. Cross-hedgers pay additional premiums in the form of increased basis risk and additional risk premiums (i.e., the option premium) that depend on the payment profile and the risk distribution of the derivative used for the cross-hedge.

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Cross-Trading

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Cross-trading, or transaction negotiation, is the "offsetting or noncompetitive matching of the buy and sell orders of two customers" (Lugra and Ewing, 2000). To illustrate, suppose two market participants are interested in shares of the same company. One market participant (MP_1) wishes to buy, and bids price p_{bid}. The other (MP_2) wishes to sell, and offers price p_{ask}. Suppose $p_{bid} < p_{ask}$. Now suppose that another bid (MP_3) and ask (MP_4), with corresponding prices p_{cross} where $p_{bid} < p_{cross} < p_{ask}$, enters the market. Because MP_3 and MP_4 will reach a price agreement on p_{cross}, the share will be sold at price p_{cross} at the agreed-upon volume. If the remaining market participants do not make any concessions, no further transactions will take place. But if concessions are reached, the share will probably be sold for a different price than p_{cross} (Morishima, 1984).

This pricing method, however, may cause market disturbances, because it is possible that a broker is able to match two offsetting orders without offering them competitively on the floor. Thus, in practice, crossing orders are subject to auction market principles, which often include a public offering at a bid slightly higher than the minimum bid-ask of both parties. In the example above, a broker wishing to cross the trade between MP_3 and MP_4 must first offer the shares of MP_3 (MP_4) at a price one minimum variation higher (lower) than p_{cross} (Hasbrouck et al., 1993). The order between MP_3 and MP_4 can then only be crossed if no other market participant or broker is interested. Otherwise, the trade may be broken up according to the bid and offer priority, parity, and precedence principles of the auction market (for more details, see Hasbrouck et al., 1993).

Cross-trading requires high information standards in order to avoid unfair settlement and increased customer risk, especially when using electronic trade-matching systems. As

Lugra and Ewing (2000) note, concerns have been expressed about "insufficient system capacity, inadequate system security, and unauthorized customer trading." However, in addition to contract or auction standards, cross-trading is also subject to Commodity Exchange Act and Commodity Futures Trading Commission (CFTC) regulations. To ensure fair trade, the CFTC regularly reviews the International Organization of Securities Commission's (IOSCO) minimum standards for electronic trade-matching.

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Crude Oil Market

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Crude oil is one of the world's most important and actively traded commodities. Several key factors influence global crude oil market prices: (1) supply, demand, and storage; (2) crude oil type; (3) market participants; and (4) events such as war and natural disasters. Crude oil is generally traded on a world market, so buying and selling prices are referred to as global prices. Since crude oil occurs in different varieties and grades, its value is expressed using certain benchmarks.

For example, in North America, the benchmark is West Texas Intermediate (WTI), which has traded on the New York Mercantile Exchange (NYMEX) since 1979. In London, the benchmark is the North Sea crude oil Brent/BFO (Brent, Forties, Oseberg), which has traded on the International Petroleum Exchange (IPE) since 1988. The Organization of Petroleum Exporting Countries (OPEC) publishes a price for a basket containing a number of local Middle Eastern benchmarks (e.g., Dubai Fateh and Oman).

The price differential between crude oil types reflects the comparative ease of refining. Less dense (lighter) crudes, such as WTI and Brent, easily yield a higher fraction of more valuable product than "heavy" crudes, such as Ural oil. Also, "sweet" crudes with less sulfur content, such as WTI and Brent, need less processing than "sour" (high-sulfur) crudes, such as Dubai Fateh. Thus, "light sweet" crude oils command higher prices than "heavy sour" crudes, which are more difficult and more expensive to refine. Refinery shortages can also widen the spread between more valuable crudes and cheaper ones (Energy Information Administration, 2007).

Worldwide, the oil industry is a highly concentrated industrial sector, where just 10 national oil companies (NOCs), mostly state-owned, control 68% of world oil reserves. In addition, since 1960, the world crude oil market has been significantly influenced by OPEC, whose goal is to stabilize worldwide oil prices by adjusting production levels to influence supply and demand.

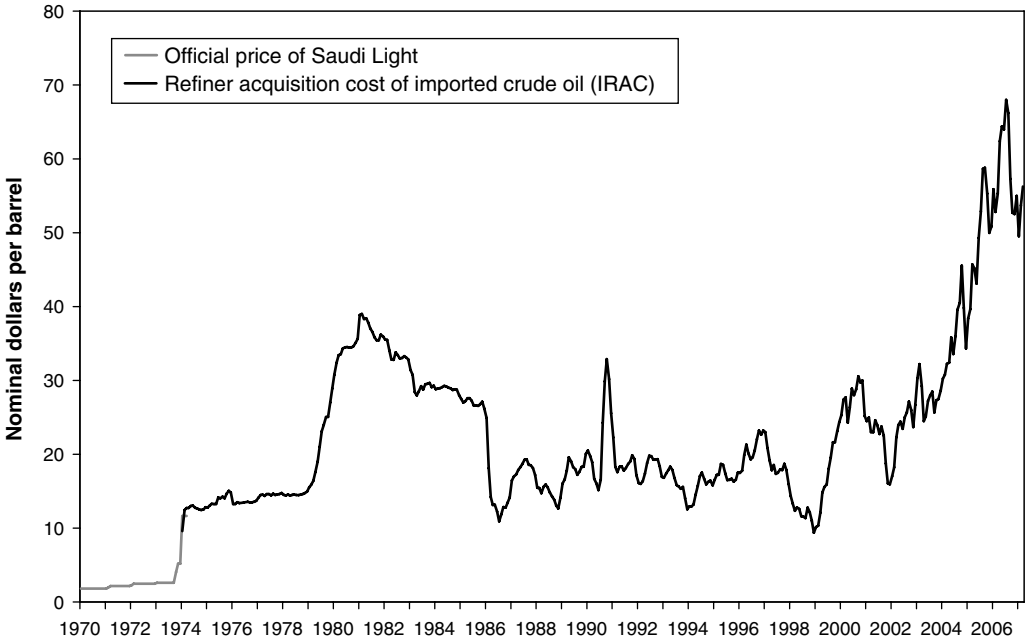

FIGURE 1
Oil prices per barrel. (From Energy Information Administration [EIA].)

Oil prices are determined by current supply and demand, as well as by expectations about future prices (Horsnell and Mabro, 1993). Prices are also affected by transportation costs and quality differences between the various types of oil. Furthermore, natural disasters (e.g., tropical storms, hurricanes, extremely cold winters), wars (e.g., the Arab-Israeli war in 1973, the Iran-Iraq war in 1980, the Persian Gulf war in 1990, and Iraq war in 2003), militant attacks (e.g., in Nigeria in 2006), oil worker strikes (in Nigeria in 1994 and in Venezuela in 2002), and economic shocks can affect oil prices all over the world (International Energy Agency, 2007) Figure 1.

Oil price spikes typically slow the rate of economic activity. If such shocks occur suddenly, when baseline economic conditions are relatively weak and inflation is high, the effects may be considerably worse. However, if prices move gradually higher and only somewhat erratically, they are not likely to cause economic recession, even during times of modest economic growth (Lee and Ratti, 1995; Huntington, 2005).

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CSFB Tremont Hedge Fund Index

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The Credit Suisse-Tremont Hedge Fund Index is the first asset-weighted hedge fund index. The index offers a representation of an investment in the alternative assets category by closely replicating the entire hedge fund universe. The index neither underweighs the best performing funds nor overweighs bad performing funds. The index represents about 400 hedge funds from different classifications. Each hedge fund that is part of the index must have more than $50 million under management with a 1-year performance record, as well as maintain financial statements that have been audited by an accounting firm. The index must have documents for each of its hedge fund managers, while maintaining transparency for investors. The rebalancing of the index is done on a monthly basis, and every quarter the selection process for including or excluding hedge fund managers occurs through a committee or board of CSFB/Tremont. To maintain a truthful representation, the index eliminates hedge funds that do not accurately report their net performance monthly returns and removes funds that have closed down their operations. The index has 10 different subclassifications and its main goals and objectives is to represent the hedge fund universe by more than 85% of assets under management in each of the subclassifications making up the CSFB Tremont Hedge Fund Index. Credit Suisse/Tremont also has an investable CSFB Tremont Hedge Fund Index (http://www.hedgeindex.com).

REFERENCE

http://www.hedgeindex.com

Curb Trading

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This is also known as "kerb" trading. It is a form of trading that takes place via telephone, computer, or any other means after the official market has closed. Originally named for securities that were traded outside the New York Stock Exchange "on the curb," because the securities were thought to be unfit for the regular market. In 1848, curb trading took place on the streets of New York. "The curb brokers often blocked the streets, and windows in the adjoining buildings were filled with brokers signaling orders to the street below." The NYSE tried to protect itself from these traders by banning access to its trading sessions. However, savvy traders eventually drilled a hole in a brick wall to the Exchange in order to hear the quotations and relay them to the street. Under the Commodity Exchange Act and Commodity Futures Trading Commission rules, curb trading, or trading after hours, is illegal.

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Currency Classification

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Commodity trading advisors (CTA) trading exclusively in currency futures are part of the currency classification. CTA databases include the following styles: Diversified, Currency, Financial and Metals, Stock Index, and Agricultural. The currency classification is the second largest of the categories (Peltz, 1997). The minimum investment of a currency trader ranges from 10,000 to 10 million USD; but most are in the range from 250,000 to 1 million USD. In 2007, the average assets under management (AUM) for a currency program were 168 million USD, whereas the median was only 28.1 million USD. The Barclay Currency Traders Index defines this classification as "… is an equal weighted composite of managed programs that trade currency futures and/or cash forwards in the inter bank market. In 2007 there are 114 currency programs included in the index" (www.barclaygrp.com).

The average annual compound return of the live currency CTAs from January 1, 1997 to December 31, 2006 is 80.40% and 124.46% for the S&P 500 Index. In addition, the correlation coefficient of the currency classification CTAs versus the S&P 500 during the same period is 0.02054.

Recent studies by Gregoriou et al. (2005) show that the median survival lifetime for CTAs in aggregate is 4.42 years, whereas the currency classification has the highest median survival time of 5.16 years. The currency classification should probably be the preferred classification of investors when deciding to add a CTA to a stock and bond investment portfolio.

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D

Deal Flow

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The term "deal flow," used by venture capitalists, refers to the number of potential investments that are offered to a fund in a given period of time. It is a measure of the volume of investment opportunities made available to a private equity investor and of the rate at which these opportunities are presented to the investors. A good deal flow means investment opportunities coming in high quality and consistent quantity. Deal flow is often regarded as the lifeline of private equity firms and critically influences the success of the investment program. It may be driven by the limited partners' total capital available, investment strategies, reputation, how effectively the investors present themselves to the market, the extensiveness of the investors' network, and so on. Some firms do better in capturing deal flows than others; experienced managers can exploit the flaws of the market to their own advantage. In private equity, where little public information is available, knowledge of the market and experience in the field thus become valuable assets. There are firms that specialize in deal flow origination and management. They provide the investors looking to promote their deal flows with help in the form of management advice and/or direct delivery of attractive investment opportunities.

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Deferred Delivery Month

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Every futures contract has a delivery month in which trading takes place. There are two kinds of futures delivery months. The first are futures with a

delivery month in the near future. For the second, futures delivery months are far away. These types of delivery months are called "deferred delivery month" because the delivery does not occur nearby (see Hull, 2007). Consider, for example, a futures contract where delivery takes place in the following month, for example, January. It is now possible to close this contract by a counter deal and reestablish the former futures position with a delivery month far in the future, for example, May. So, the delivery is deferred from January to May. When the supply of a traded commodity of a futures contract is very low, participants of the future markets are willing to pay a premium for contracts with a nearby delivery month in comparison to contracts with a deferred delivery month, so that such kinds of futures contracts are traded in backwardation.

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Deferred Futures

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A deferred futures is a futures contract that expires during the most distant months. It is also called "back months." According to Kastens and Schroeder (1996), deferred commodity futures prices contain considerable information regarding market expectations of futures prices. For instance, they show that wheat deferred futures prices are considered as the best estimate of harvest time price from 6 months prior to harvest up to harvest. Their reasoning is founded on the well-known equation for the basis of a futures contract: basis = cash price − futures prices. We thus have: cash price = basis + futures price. Taking expectation on both sides, we get: expected cash price = expected basis + futures price. Hence, the technique of forecasting is simple. It consists of adding a forecast of the basis to today's future price of the futures contract that will be nearby during the forecast period. Note that commodity futures prices may be used to forecast future spot prices because there is a convenience premium in the cost-of-carry of a commodity. The net cost-of-carry, designated by *cc*, is equal to: *cc* = financing cost + storage cost − convenience premium. The convenience premium is not an observed variable and thus allows the futures price to be used as forecast of the corresponding future spot price. The price F_c of a commodity contract is thus: $F_c = S_c e^{cc}$, where S_c is the spot price of the commodity. But a strict arbitrage argument rules the computation of the price of a financial contract. If the underlying does not pay dividends or any other cash-flow, the price F_F of a financial contract is: $F_F = e^r S_F$, with r being the risk-free rate and S_F—the spot rate of the underlying. This relation is determinist and we, thus, cannot use the futures price as a forecasting tool in this case (Kastens and Dhuyvetter, 1998; Racicot and Théoret, 2004, 2006).

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Deliverable Grades

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The common grades of commodities, as determined by the government and/or the exchange, must be partially met while delivering income against futures contracts. The differences in grades can either sell at a premium or at a discount. In some cases a variety of deliverable grades is given in order to meet the contracts in the cash or in the future markets, thus reducing the delivery risk. The fact that the delivered commodity in the futures market might have specifications other than those needed by the buyer leads to a basis risk. For example, crude oil is differentiated by the location of exploration (e.g., Brent, Western Texas, Dubai, and Tapis), its viscosity (light, intermediate, heavy), and its sulfur content (sweet, sour). An oil future contract specifies the quality of the crude oil underlying the contract.

NYMEX Light Sweet Crude Oil futures references to crude oil with a sulfur content of lower than or equal to 0.42% and 40° API, for example, Western Texas Intermediate, New Mexican Sweet, or Oklahoma Sweet. The delivery of other qualities, for example, Brent Crude or Oseberg Blend, leads to lower prices for the seller, while in the case of Nigerian Bonny Light a higher price results. The NYBOT Cotton No. 2 contract uses Strict Low Middling, 1 2/32nd inch staple cotton as the cash price equivalent for quality specification and delivery purposes.

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Delivery Date

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In futures contracts for commodities, the purchase or sales price of commodity on a future date at a specific price is agreed. In majority of cases, the investors who operate with these contracts close out their positions prior to the delivery period specified in the contract. However, when they do not close out their positions, they proceed to the delivery of the underlying asset (only a small proportion of futures contracts that are negotiated in the organized markets lead to the delivery of the underlying asset). Therefore, the delivery day is the day on which the delivery of the underlying asset has to be made and the dealer having a short position must issue a notice of intention to deliver to the exchange clearinghouse. As a result, the number of contracts that will be delivered is established, together with where the delivery has been made and the grade that will be delivered. Each organized market establishes its own delivery procedures for each contract; thus, according to

the Chicago Board of Trade Market (http://www.cbot.com), "The Delivery of Denatured Fuel Ethanol Shipping Certificates may be made by the Seller upon any permissible delivery day of the delivery month but no later than the second business day following the last day of trading in a delivery month."

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Delivery Instrument

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In commodities futures contracts, the purchase or sale of a specific commodity is agreed on a date in the future at a specific price and under previously agreed conditions. In the majority of cases, the investors who operate with these contracts close out their positions prior to the delivery period specified in the contract. However, when they do not close out their positions they proceed to the delivery of the underlying asset. In order to provide the greatest flexibility for delivery in these circumstances, the underlying asset is not normally delivered physically. Instead, a document is delivered in its place, which is known as a delivery instrument. Depending on the type of commodity and the type of market in which the contract is negotiated, the delivery instrument may be warehouse receipts, shipping certificates, demand certificates, and so on. So, for example, in futures contracts for Ethanol within the Chicago Board of Trade, it is specified that: "the delivery instrument for the Ethanol contract will be a shipping certificate, which gives the buyer the right, but not the obligation to demand load-out of physical ethanol from the firm that issued the certificate […]. Shipping certificates are only issued by firms that are approved to be regular for delivery by the Chicago Board of Trade […]."

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Delivery Notice

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A delivery notice is the formal notification from the holder of a short position—who agrees to sell a commodity—of all the details for the settlement, that is, it is a written contract with the date and all the details for clearing. This notification is made first to the clearinghouse, and it has to notify the advice to the holder of the long position who agrees to buy a commodity. This procedure is necessary because in a futures contract the two parties often do not know each other, so the clearinghouse acts as a guarantee for both that the contract will be honored. In the futures market, the delivery notice is important for both short and long

positions because in contrast to forward contracts, and although futures contracts are standardized, they often do not specify that delivery is to take place on a particular day; that is, the contract is referred to by its delivery month and allows the holder of the short position to deliver at any time during this period, provided the intention to deliver is advised a few days before delivery. In commodities trading the short position also fixes the delivery location and the commodities grade.

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Delivery Point

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The delivery point is where a commodity is actually delivered if the buyer of a futures contract decides to take possession of the commodity. The delivery agreement should specify the exact location, the quantity and quality of the asset to be delivered, and the exact date and time of delivery. Many futures contracts are canceled before the expiration date and delivery never occurs; however, in some cases, end users of commodities want delivery to occur. In other cases, speculators do not wish to take physical delivery of a contract but rather the cash value. For example, a jewelry store in New York might enter into a futures contract to protect against a sudden increase in the price of gold. Further, they might wish to take actual delivery of gold to prepare merchandise for sales in their retail outlets. How and exactly where gold is to be delivered is determined by the exchange on which gold trades. Speculators in this market attempt to profit on price movements and do not wish to take actual possession of gold, just the profits they can earn.

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Demand Rights

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A Demand Right grants the investor the option to demand the company to initiate and pursue the registration of the holder's stock so that it can be sold on the public market. By granting access to the public stock markets, Demand Rights offer investors the possibility to generate liquidity and unlock the potential value of their investment. Demand Rights may be of significant concern to strategic investors who hold a sizable stake in the company and might therefore be considered as an 'affiliate.' In the absence of a full registration statement, the amount and timing of shares that

can be sold by affiliates are restricted and therefore hamper their access to liquidity. Consequently, strategic investors may seek Demand Rights as a means of achieving liquidity from its equity investment.

Going public can be expensive and time-consuming, and may adversely affect capital-raising plans of the company. Therefore, the investor generally will want to negotiate limitations in the registration rights agreement, such as limiting when rights can be exercised, minimum percentage of investors necessary to exercise, the size of the offering, and the allocation of expenses. The company could be granted the right to delay demand registrations, if business conditions were adverse or if the registration of the stock had negative impacts on the company.

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Derivatives Transaction Execution Facility (DTEF)

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A derivatives transaction execution facility (DTEF) is a specialized commodity derivatives board of trade. Operation of these facilities is regulated by United States Code, Title 7—Agriculture, Chapter 1, also known as the Commodity Exchange Act (CEAct), specifically in Section 7a, "Derivatives Transaction Execution Facilities." According to those regulations, any DTEF must be registered with the Commodity Futures Trading Commission (CFTC) [see also CFTC (2006)]. Since access to DTEFs is more restrictive, they are subject to fewer regulatory requirements than regular (designated) contract markets, where retail participants are generally allowed to trade. To qualify as a DTEF, trading facilities are also subject to the following rules:

- Contracts traded on DTEFs are subject to criteria that ensure delivery supply and market fungibility, and minimize market manipulation. According to the CEAct, the CFTC distinguishes between two types of commodity contracts allowed for trade:
  1. *Excluded commodities*, where the underlying commodity has no cash market and a nearly inexhaustible deliverable supply that is large enough for the contract to be considered highly unsusceptible to manipulation. The contract must also be a security futures product, that is, financial commodities [Section 7a. (b) CEAct].
  2. *Exempt commodities*, where the CFTC makes individual determinations based on commodity characteristics that the contract (or option) is highly unsusceptible to manipulation, that is, metals and energy commodities [Section7a. (b) CEAct].

  Note that agricultural commodities are neither excluded nor exempt

commodities, but rather come under the CFTC's jurisdiction.

- The CFTC distinguishes between "regular DTEFs," or "eligible participant DTEFs," and "commercial DTEFs," or "eligible commercial entity DTEFs."
- According to Section 5a of the CEAct, regular DTEFs must limit the products they trade to excluded commodities and exempt commodities. The admission of a commodity (contract) as an exempt commodity may be requested by a registered DTEF. Regular DTEFs are accessible only to "institutional traders and noninstitutional traders trading through highly capitalized Futures Commission Merchants (FCMs)," further specified by [Section 7a (b) 3 of the CEAct (CFTC (2006)].
- Commercial DTEFs may trade any commodities except the approximately 30 basic agricultural commodities listed under Section 1a(4) of the CEAct, unless determined otherwise by the CFTC. Commercial DTEFs are accessible by eligible commercial entities according to Section1a (11) of the CEAct, as well as "registered floor brokers or floor traders trading for their own accounts whose trading obligations are guaranteed by a registered futures commission merchant" (CFTC (2006)).

To summarize, DTEFs restrict trade to only those commodities that are considered the most difficult to manipulate (excluding agricultural products). They also generally exclude participants with less than U.S. $20 million in net capital, and registered commodity trading advisors (CTAs) with less than U.S. $25 million in managed net capital.

For further information, see http://www.cftc.gov/dea/deadtefbackground.htm.

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Designated Contract Market

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A contract market is a U.S. legal term for a market on which futures contracts are traded. A designated contract market (DCM) is a contract market that has been "designated" or approved by the Commodity Futures Trading Commission (CFTC), the federal agency with jurisdiction over futures and options on futures trading. In fact, there are no active contract markets that are not designated because the Commodity Exchange Act requires that futures contracts legally be traded only on a designated contract market, so it would be illegal and foolhardy for a contract market to operate without being designated.

Beginning with the Commodity Futures Modernization Act of 2000, the law has allowed the trading of futures contracts on several types of more lightly regulated types of markets. These include a Derivatives Transactions Execution Facility, an Exempt Board of Trade, and an Exempt Commercial Market. The DCM may list any type of futures contract and allow all types of traders including retail traders. Because

of this, it is also the most fully regulated of the markets on which futures trading is allowed. The other more lightly regulated markets must restrict the products that may be listed and restrict traders to institutions or those who are more sophisticated or have significant commercial ties.

In order to receive and maintain the CFTC designation, an exchange must submit an application demonstrating its compliance with 8 designation criteria and 18 core principles [see CEA, Section 4(a)]. This ensures that the exchange will work to prevent market manipulation, ensure fair and equitable trading, enforce its rules and discipline its members, effectively manage conflicts of interest, make its market data available to the public, and keep appropriate books and records, among other things.

The more common industry term for a contract market is a futures exchange. There are currently, according to the CFTC, 13 active U.S. designated contract markets: the Chicago Mercantile Exchange, Chicago Board of Trade, New York Mercantile Exchange, Commodity Exchange, ICE Futures US (formerly the New York Board of Trade), Kansas City Board of Trade, Minneapolis Grain Exchange, One Chicago, CBOE Futures Exchange, Chicago Climate Exchange, HedgeStreet, Philadelphia Board of Trade, and the U.S. Futures Exchange.

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Commodity Exchange Act: Section 4(a) regarding requirement that all futures, unless otherwise exempted must trade on a DCM, Section 5 (b) regarding 8 designation criteria, and Section 5(d) regarding 18 core principles.

http://www.cftc.gov/industryoversight/tradingorganizations/index.htm on the CFTC Website regarding the list of currently designated contract markets.

Designated Self-Regulatory Organization

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A self-regulatory organization (SRO) is charged with regulating the activity of traders and brokers in a given financial market. In the United States, examples include the Financial Industry Regulatory Authority (FINRA) and the National Futures Association (NFA). Outside of the United States, futures and stock exchanges often serve the role of the SRO. The goal of the SROs is to ensure the integrity of markets and market participants. The registration of brokers and brokerage firms is required to maintain ethical standards as well as minimum capital requirements. At times, a given broker may be subject to the oversight of a number of SROs given their trading in a variety of regulated markets. Rather than duplicating the oversight effort across a number of regulatory agencies, the SROs agree among themselves as to which regulator is to lead the oversight effort over a specific broker. This designated self-regulatory organization is the single SRO that has been given regulatory responsibility over an entity that may otherwise be subject to the regulation by a number of SROs.

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http://www.cftc.gov
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http://www.finra.org

Direct Public Offering

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The term "direct public offering" (DPO) is used to describe the offering of securities to the public without the involvement of a financial intermediary in the form of an underwriter. Governments and companies conduct a DPO in order to raise debt finance and debt or equity finance, respectively. In the latter case, the company offers the shares typically to its customers, suppliers, and employees. A much broader public is focused in Internet DPOs.

There are two main reasons for companies to conduct a DPO instead of an underwritten offering: (1) underwriters refuse to take the company public due to its size, its insufficient economic success in the preoffering years, and/or its poor growth prospects; and (2) an underwritten offering tends to be more expensive than a DPO with regard to direct transaction costs, due to the underwriting fee; therefore, an underwritten offering might be unaffordable for small or newly founded firms. Furthermore, a DPO may be particularly appealing when the issuer itself has sufficient knowledge and resources to conduct the offering.

However, significant indirect transaction costs, that is, lower proceeds from the DPO, may be incurred due to adverse selection effects of asymmetrically distributed information between the issuer and the potential investors. The investors may be unable to determine the issue(r) quality because the company cannot signal its quality by choosing a particular underwriter, and investors do not receive necessary information from the underwriter. Consequently, investors will require a risk premium, which forces the issuer to sell the securities at a discount.

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Directional

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As stated by Bruce (2002), there are two main categories of hedge fund strategies: directional and nondirectional strategies. Directional strategies are those in which hedge fund managers have an exposure to the underlying market they are invested in. The managers try to profit from their view on the market even if not all their return expectations come from market trends. Over the long term the managers believe that the market they are invested in will rise. In other words, the managers keep a net exposure to the market they are invested in. In most cases, directional managers have long net exposure to the market but managers who tend to be net short or change the net exposure significantly and consistently over time can also be considered as directional. When managers assume net long exposures, they will profit from increase in the price of the underlying portfolio, while if they are net short, they

will profit from decrease in the price of the underlying positions. Hedge fund managers tend to combine long and short positions in the market they are active in but have a greater number of long positions than short ones globally (more short position than long positions). While in nondirectional strategies the weight of the longs and the shorts tend to be almost equal to limit the market risk, that is, the risk of loosing money in case of unexpected market move. Long exposure can be taken not only in equity markets but also in fixed income markets and the commodities markets. Generally, a strategy or managers are said to be directional when they try to profit from the market trend. Classic mutual funds can be seen as extreme directional funds as they are almost always 100% long the market while trying to beat their respective benchmark. In some cases, hedge funds managers take an approach of being invested in 100% long equities. Funds invested in illiquid positions may or may not be impacted by general market movements due to their illiquidity.

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Discretionary Account

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A discretionary account is an account for which the owner delegates the investment responsibilities to an investment manager. The manager has the authority to make portfolio decisions, such as what securities to buy, at what price, and at what time, without the preapproval of the owner. At the onset, the owner may specify some investment restrictions, such as limits on allocations to selected companies, countries, or instruments, but otherwise let the discretionary manager follow the strategy in which he specializes. When trustees of a pension plan delegate investment responsibilities to a discretionary manager, they obtain professional management for the account and transfer fiduciary liability to the manager. Large discretionary mandates are often managed in separate or managed accounts.

Unlike commingled funds, separate accounts are created for the benefit of a sole investor. Hedge fund managers often offer separate accounts with high investment minimums—typically $10 million. These accounts are managed in parallel to a main hedge fund offering but they offer the investor higher transparency and liquidity than the fund does. Once a separate account is opened with a broker, the client can monitor the investment activity, track all gains, losses, and investments made on his behalf by the manager, receive regular risk reports, and be fully informed but still have the benefit of outsourcing the active investment decisions.

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Discretionary CTA

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A discretionary commodity trading advisor (CTA) trades futures contracts, typically without the use of a computer-based trend following system, but at the discretion of a trader. Many CTAs are trend followers, who strive to take long positions in upward trending markets and short positions in downward trending markets. A CTA may trade in a wide variety of markets worldwide, perhaps following over 150 futures contracts in agricultural, energy, precious and industrial metals, bonds and interest rates, currencies, and stock index futures. While systematic CTAs often trade a large number of markets, discretionary CTAs often choose to specialize in a narrower sector. For example, many discretionary CTAs may limit themselves to trading exclusively in the currency or energy markets. CTAs are subject to the regulation of the Commodity Futures Trading Commission (CFTC).

Discretionary CTAs are often called fundamental traders, as many fund managers simply focus on the key fundamentals that move each market. For physical commodities, they may study supply trends, including warehouse inventory levels, and the forecast for new drilling for energy commodities or plantings for grains. Weather can play a significant role in the demand forecast for many energy commodities and the supply forecast for grains. Some discretionary CTAs even employ weather forecasters to get an edge in predicting shocks and trends in demand or supply. On the demand side, fund managers can focus on economic growth, population growth, shipping expenses, prices of substitute goods and changes in income, and tastes and preferences to predict how quickly the supply will be sold. If the manager predicts that demand will exceed supply, prices are forecasted to move higher. If the manager predicts that supply will exceed demand, prices are forecasted to move higher. Note that discretionary CTAs often have different factors for each market, as they believe that different market forces impact the price of each commodity futures contract. Technical price factors may play a role in the decision process, but price, volume, and volatility trends are clearly less important for discretionary CTAs than for systematic CTAs.

The funds offered by CTAs are often called managed futures funds. Discretionary CTAs often have a higher return and a lower volatility than systematic CTAs. However, discretionary CTAs often have a higher correlation to traditional long only investments in stock and bond markets. Therefore, the average discretionary CTA may have less ability to reduce the downside risk of a traditional investment portfolio when compared to a systematic CTA. The returns of discretionary CTAs and systematic CTAs have historically been uncorrelated. Even though the two styles of fund management may trade similar markets and both be called commodity trading advisors, their trading models are clearly capturing different factors and price trends. Discretionary CTAs may have positions that are similar in direction and rationale to global macro fund managers, but the managed futures funds are typically more diversified and less volatile.

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Discretionary Trading

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Discretionary trading is a subjective trading approach where traders utilize a variety of inputs to determine their trade. Inputs may include fundamental analysis, technical analysis, and daily news, all of which are relevant in making trading decisions. Fundamental analysis is performed where the trader uses company financial information and the competitive environment to forecast the future earnings per share and price movements. Technical analysis attempts to identify future price movements by researching past relationships among variables in conjunction with previous period price movements (Levinson, 2006). Discretionary traders also have the ability to vary the importance of their inputs based on their view of the market and tend to focus on a few markets. They have the ability to react to news, technical price movement, or fundamental information in order to adjust their position size accordingly. This is contrary to a systems trader who trades objectively using a fixed set of rules to determine timing and sizing of trades. The focus of a systems trader is to identify a time frame (e.g., daily, weekly, monthly), determine the trend status, and then predict the direction of the future trend (Chande, 2001). System rules encompass all aspects of the trade from the number of contracts traded to entry and exit point. Mechanical system rules remain constant, which is contrary to a discretionary trader who has the flexibility to adjust the inputs of a trader based on the trader's view of the markets (Table 1).

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TABLE 1

Discretionary vs. Mechanical System Trader

Discretionary Trader	Mechanical System Trader
Trades "information" flow	Trades "data" flow
Anticipatory traders	Participatory Traders
Subjective	Objective
Many rules	Few rules
Emotional	Unemotional
Varies "key" indicator from trade to trade	"Key" indicators are always the same
Few markets	Many markets

Source: Chande (2001).

Distressed Debt

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A corporate bond trading at an "option-adjusted" spread or yield-to-maturity of 10% or higher relative to its treasury benchmark is defined as distressed debt by Standards and Poor's (Vazza et al., 2007). The option could be an embedded option in the bond, such as a call option for a callable bond. Naturally, distressed debts have a high level of credit risk, probability of default and/or bankruptcy filing.

Can investment in distressed debt trading at a fraction of its face value be profitable? Eberhart and Sweeney (1992) examine informational efficiency in the bankrupt bond market. Specifically, they test for two things. First, they determine whether the price of a bond once it enters bankruptcy is a reasonable estimate of the discounted payoff from the instrument once it emerges from bankruptcy. The discount factor reflects time value of money and risk premium. Second, they compute equally weighted cumulative abnormal return for a portfolio of distressed bonds. If the market for distressed debt is inefficient, then the abnormal return should be positive and it should be possible to profit from trading these bonds even after subtracting transaction cost.

The evidence is mixed. In some cases, they find that the market for distressed debt is efficient, and in others, they reject the notion of market efficiency. When they treat different bonds from the same firm as separate bonds, the results do not favor market efficiency. They argue that the latter results are less reliable because of the high correlation among bonds issued by the same firm and also because the results reported are before subtracting transaction cost.

What then is the source of value from investing in distressed debt? Hotchkiss and Mooradian (1997) argue that "vulture investors," or those who invest in the debt of a financially distressed firm, reduce managerial agency problem, improve governance and operating performance of the distressed firm, and thus enhance the value of the firm (Hotchkiss and Mooradian, 1997). This should be especially true when the vulture investor becomes the Chairman, the CEO, or the controlling shareholder. If the market perceives the investment by a vulture investor as good news associated with superior operating performance, this should also show up in the firm's equity price, because the equity holders now have a higher probability of recovering their residual claim. The authors find no evidence of positive abnormal return either on the bond or on the stock when a vulture investor purchases publicly traded debt. They, however, find a 9.4% positive abnormal return on the bonds and 6.4% abnormal stock return when a vulture investor becomes the CEO or the chairman. The abnormal return on stock has lower statistical significance.

Using a dataset of defaulted firms in the United States between 1982 and 1999 Acharya et al. (2007) compute the average recovery prices for firms in default. They discount the price of debt on emergence of bankruptcy the following way:

$$P_{e0} = P_{e1} \cdot \frac{I_d}{I_e}$$

where P_{e1} = the emergence price of the distressed debt; P_{e0} = the emergence price of the debt discounted to the time of default; I_e = high yield bond indices level at the emergence date; I_d = high yield bond indices level at the default date.

P_{e1} or the emergence price has been obtained by the authors from Standard and Poor's Credit Pro database. Credit Pro uses the trading prices of the prepetition debt instruments at the time of emergence as well as the earliest recorded trading prices of the new instruments received at bankruptcy settlement, among others.

As different firms spend different amount of time in bankruptcy, discounting standardizes the amount of future recoveries to their value at the time of default. Lehman Brothers, Merrill Lynch and Solomon Brothers high yield bond indices have been used by the authors to discount the emergence price. These indices are for total return and include reinvestment income.

Recovery rate is a function of the type of debt. The authors show that senior secured debts have a recovery rate of 59.1% and were closely followed by senior unsecured with a recovery of 55.9%. Senior subordinated debts recover 34.4% or about a third of the face value. Subordinated and junior subordinated debts recover only 27 and 18 cents to a dollar of face value, respectively.

Finally, the authors find that recovery rate is the highest in the utility industry with an average of 74.5% (of the face value of debt) and the lowest in the insurance and real estate industry, closely followed by the transportation industry with average recoveries of 37.1% and 38.9%, respectively. This suggests that recovery may be asset specific. Recovery rate is also lower when a large number of firms default around the same time.

The last is consistent with earlier evidence provided by Pulvino (1998) who argues that recovery rate should depend on the condition of the industry in which the distressed firm operates. He shows that aircrafts sold by financially distressed firms receive lower prices than companies that sell aircrafts when they are not financially constrained (Pulvino, 1998).

It is possible to argue that the relevant measure for return on distressed debt or recovery rate should not be computed relative to the face value of the debt and the correct benchmark is the price of the bond once it satisfies the definition of "distressed debt" or once it defaults or files for bankruptcy.

Using a sample of corporate bankruptcies filed in Arizona and New York between 1995 and 2001, Bris et al. (2006) obtain recovery rate as the following:

$$\text{Recovery} = \frac{V_e}{V_d}$$

where V_e = "Value of assets" on emergence of bankruptcy; V_d = "Value of assets" prior to default.

The "value of assets" is as declared by the firms and V_e is before subtracting legal and administrative expenses. Asset values are self-reported by the firms in distress, may not always be market value, and occasionally include intangibles.

For secured creditors, the authors find a median (mean) recovery rate of 0.8% (17.2%) for the firms that filed for Chapter 7 liquidation and 86.9% (106.5%) for the firms that filed for Chapter 11 reorganization (Bris, Welch, and Zhu, 2006). These results should not be interpreted as evidence that the choice of Chapter 7 liquidation or Chapter 11 reorganization accounts for such large differences in the recovery

rate. Rather, the firms that have a higher expected value as an ongoing concern are more likely to file for Chapter 11 reorganization. The authors, however, argue that Chapter 11 allows superior asset preservation. Hence, creditors recover more than they would in a comparable Chapter 7.

The authors also report that the median (mean) expenses for Chapter 7 liquidation and Chapter 11 reorganization are 2.5% (8.1%) and 1.9% (16.9%) of the prebankruptcy asset value, respectively. Both recoveries and expenses are positively skewed.

If all distressed firms behave similar to the sample used by the authors, and if at the onset of distress investors are able to pick the Chapter 11 firms that eventually have a recovery in the 75th percentile or higher but bankruptcy expenses in the 50th percentile or lower, they are likely to earn approximately 18% or higher return between bankruptcy filing and emergence. These returns are without adjusting for risk. Even if the distressed firm spends only 550 days (25th percentile in the sample used by the authors) in bankruptcy, whether the level of return is adequate for the risk involved or if it is comparable to any relevant benchmark is beyond the scope of this discussion.

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Distressed Securities

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"Distressed securities" is a generic term that usually points at public and private debt and equity securities of firms that have defaulted or are in the process of doing so. Most of the time, this arises because these firms have a bad balance sheet (their liabilities exceed their assets) or weak cash flows (they are unable to meet their debt service and interest payments as they become due). By convenience, debt securities that trade at sufficiently discounted prices—the usual threshold is an excess yield of 10% above comparable duration U.S. Treasury bonds—are usually also considered as distressed securities.

The key point in distressed securities investing is that there are more sellers than buyers. Many individual investors panic at the early signs of financial distress and would do anything to exit from their positions. Many institutional investors are banned by their mandates from holding distressed securities (or noninvestment grade securities) and will become forced sellers. As a result, the price of distressed securities is usually far below their fair value and they offer interesting investment opportunities,

provided one is willing to spend some time liquidating or restructuring the underlying issuers.

In several countries, there is a very clear process and priority order when it comes to liquidating or restructuring a company. For instance, in the United States, senior secured creditors are paid first (mortgages, senior secured bank loans) followed by senior unsecured (senior unsecured bank loans, bonds), subordinated unsecured (trade claims, lease rejection claims, priority claims, convenience class claims), and ultimately equity. While financial distress will usually significantly impact the price of all claims because of the panicked sellers, the reality is that some creditors are in a better situation than others if the distressed entity were to be liquidated. If they are willing to hold their securities and face temporary illiquidity, they can use their bargaining power to negotiate debt restructurings, hold up other claimants (typically the junior lenders), and avoid liquidation, either in out-of-court restructurings as well as in Chapter 11 reorganizations. This is exactly what distressed securities hedge funds are doing.

There are essentially two approaches to distressed securities investing: the *trading-oriented* approach and the *control-oriented* approach. The trading-oriented approach consists in opportunistically purchasing distressed securities because of their attractive valuations and selling them quickly to another entity at a higher price. There is usually no intention to seek control over the underlying issuer. By contrast, the control-oriented approach consists in buying fundamentally good businesses and taking an active role in their restructuring, either on the operational or on the financial side or on both. The investment process usually starts by accumulating a significant amount of senior securities to obtain a blocking position, that is, more than one-third of the given class of claims, and then opening the negotiations with other claimholders. The controlling position is often held for a long-term period and the exit will only take place after the issuer's recovery.

Diversified Classification

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Commodity trading advisers (CTAs) trade a variety of futures and currency markets. CTAs may also be referred to as managed futures funds. The underlying futures contracts traded by these funds may represent investments in commodity markets, including energy, industrial metals, precious metals, grains, meats, and softs. CTAs may also trade financial futures and forward contracts, including interest rates and fixed income securities, equity indices, and currencies. CTAs that trade only financial futures and forwards fit into the financial classification of CTAs. Most CTAs would fall into the diversified classification, which trade futures on both financial and physical commodities. On average, commodity trading advisers invest about 75% of assets in financial futures and forwards, and only about 25% in futures on energy, metals, and agricultural commodities. Generally, financial futures are more liquid than commodity futures. This greater liquidity leads CTAs to have a larger allocation to financial futures.

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Double Hedging

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A double hedging strategy allows to hedge against a risk coming from a single source via two different forward/future contracts. Kawai and Zilcha (1986) have studied the case of a firm producing goods (Q) and selling them abroad. If each good can be sold at a stochastic foreign price (P) and the exchange rate is E (stochastic itself), then the firm profit (Π) is given by

$$\Pi = PEQ - C(Q)$$

where $C(Q)$ is an increasing and strictly concave cost function. Now, let us assume that there are two forward markets for both the firm product and the exchange rate. In particular, a forward contract on the commodity market allows the firm to sell its product at a given (foreign) price (P_{F}) independent of the actual price. Thus, the payoff of this commodity forward is ($P_{\mathrm{F}} - P$). Seemingly, the forward contract on the exchange rate market allows the firm to sell the foreign currency at a given price (E_{F}) independent of the actual exchange rate and its payoff is then equal to ($E_{\mathrm{F}} - E$).

If the firm is allowed to buy or sell any quantity of the above- mentioned forward contracts (θ_{P} and θ_{E}, respectively), then its profit is now given by

$$\Pi = PEQ - C(Q) + \theta_{\mathrm{P}}(P_{\mathrm{F}} - P)E + \theta_{\mathrm{E}}(E_{\mathrm{F}} - E) \quad (1)$$

where we see that we have only one source of risk (firm profit PEQ) and two markets where such a risk can be hedged (commodity market and exchange rate market).

The firm is willing to hedge against risk if and only if it is risk-averse. Its risk-attitude can be represented by taking a strictly increasing and concave transformation of its profit (such a transformation is called utility function $U(\cdot)$ in the consumption theory). The firm problem can thus be written as

$$\max_{Q,\,\theta_{\mathrm{P}},\,\theta_{\mathrm{E}}} \mathsf{E}[U(\Pi)]$$

where E is the expected value operator (the stochastic variables are P and E). The three first-order conditions (FOCs) on Q, θ_{P}, and θ_{E} are, respectively

$$\mathsf{E}\left[\frac{\partial U(\Pi)}{\partial \Pi}\left(PE - \frac{\partial C(Q)}{\partial Q}\right)\right] = 0$$

$$\mathsf{E}\left[\frac{\partial U(\Pi)}{\partial \Pi}(P_{\mathrm{F}} - P)E\right] = 0$$

$$\mathsf{E}\left[\frac{\partial U(\Pi)}{\partial \Pi}(E_{\mathrm{F}} - E)\right] = 0$$

By combining the three FOCs (and using the linearity of the expected value) we easily obtain the optimal condition on production

$$\frac{\partial C(Q^*)}{\partial Q^*} = P_{\mathrm{F}}E_{\mathrm{F}}$$

from which we see that the optimal production Q^* does not depend on the hedging decisions.

To compute the optimal value of θ_P and θ_E (i.e., the double hedging) we need to know the joint behavior of all the stochastic variables. Using the covariance identity (with C the covariance operator), the two last FOCs can be written as

$$\mathsf{C}\left[\frac{\partial U(\Pi)}{\partial \Pi}E;(P_F - P)\right] + \mathsf{E}\left[\frac{\partial U(\Pi)}{\partial \Pi}E\right]\mathsf{E}[P_F - P] = 0$$

$$\mathsf{C}\left[\frac{\partial U(\Pi)}{\partial \Pi};(E_F - E)\right] + \mathsf{E}\left[\frac{\partial U(\Pi)}{\partial \Pi}\right]\mathrm{E}[E_F - E] = 0$$

We will now introduce the two most relevant assumptions: (*i*) the commodity future market is unbiased (i.e., $\mathsf{E}[P_F - P] = 0$), and (*ii*) the risk premium on the exchange rate is zero. If we call Q the risk neutral probability measure, then Hypothesis (*ii*) implies $\mathsf{E}[E_F - E] = \mathrm{E}^Q[E_F - E] = 0$. The commodity future has not been evaluated by using Q since this probability only relates to the financial market.

If Hypotheses *i* and *ii* hold, then the two previous FOCs ask for the two covariances to be zero. In other words, we want Π to depend neither on P nor on E. This means that θ_P and θ_E must be set in order to have zero coefficients for both P and E in Equation 1

$$PEQ^* - \theta_P PE = 0$$
$$PEQ^* + \theta_P(P_F - P)E - \theta_E E = 0$$

from which we immediately obtain the double hedging strategy

$$\theta_P = Q^*$$
$$\theta_E = Q^* P_F$$

that is, we go long on the commodity forward by the amount of the optimal production and we go long on the exchange rate forward by the forward (foreign) value of the optimal production. Battermann and Broll (2001) have generalized this framework for taking into account the inflation risk by obtaining that θ_E depends on the cost function.

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Dow Jones-AIG Commodity Index

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According to Raab (2007), the Dow Jones-AIG Commodity Index (DJ-AIGCI) uses two-thirds of a dollar-weighted liquidity measure combined with one-third of a dollar-weighted world-production measure to determine which commodities to include in the index. Any commodity that falls below a 0.5% threshold is eliminated from consideration. Also, the DJ-AIGCI limits weightings for each commodity sector to 33% and rebalances annually. The sector weighting limits are in contrast to the S&P GSCI, which was weighted 70% in energies, as of the spring of 2007. Like the GSCI, the

DJ-AIGCI consists of the same five commodity sectors: energy, industrial metals, agriculture, livestock, and precious metals. The DJ-AIGCI consists of 19 individual commodities while the GSCI includes 24 commodities. The DJ-AIGCI was launched in 1998. Akey (2007) notes that the unique benefits of the DJ-AIGCI are its emphasis on liquidity for weighting and its diversification rules. As of the end of 2006, there was an estimated US$30 billion tracking the DJ-AIGCI.

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Down Capture Ratio

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The down capture ratio is a measure of a manager's sensitivity to an index when the index has negative returns. It is calculated by dividing the manager's annualized performance return for the intervals of time during the measurement period when the index was negative by the index's negative returns over the same intervals (Davidow, 2005). For example, if the S&P 500 was down 100 basis points and a manager was down 35 basis points over the exact same period of time, the down capture ratio would equal 35%. A down capture ratio that is greater than 100% indicates a manager lost more than the index when the index had negative returns. Likewise, a down capture ratio that is less than 100% indicates a manager lost less than the index when the index had negative returns. Lastly, a down capture ratio that is negative indicates a manager had positive returns when the index had negative returns. Since the down capture ratio measures how much of the negative index returns a manager captured, the less it is the better. However, the down capture ratio (and all risk measures) should be evaluated in conjunction with other investment metrics to best assess the manager's performance and risk profile.

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Down Round

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A *down round* is private equity or venture capital financing for a company where the valuation is lower than that in the prior round of fundraising. This is especially common in venture capital, a subset of the private equity industry that focuses on high risk, high growth opportunities. Venture capital firms use *staged capital* where they provide a limited amount of capital to an entrepreneurial company, typically investing enough to help it advance to an important milestone thereby demonstrating that the overall investment risk has been reduced

(Pearce and Barnes, 2006). If the entrepreneurial company performs as expected, as per the business plan, then the next stage (or round) of funding is typically done at a higher evaluation. However, should the company perform below expectations or have a material adverse event—for example, if the key drug of a pharmaceutical firm performed poorly in an FDA trial—then the valuation of the company would fall, resulting in a down round. While down rounds are usually the result of performance issues in the portfolio company, they can also be the result of a poor external fundraising environment. An example of this situation was when the Internet bubble collapsed in 2001; this created a major shortage of risk capital, thereby putting companies needing to raise money in a weak bargaining position.

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Downside Deviation

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One of the main differences between *traditional return* analysis and *absolute return* analysis is accepting the fact that volatility is good, provided it is on the upside. Indeed, most investors should be less concerned with upside volatility, and focus more on *downside deviation* as an impediment to reaching a particular performance goal. Downside deviation introduces the concept of minimum acceptable return (MAR) as a risk factor. If a retirement plan has annual liabilities of 8%, the plan's real risk is achieving returns of 8%—not whether it has a high or low standard deviation.

Downside deviation considers only the returns that fall below the MAR, ignoring upside volatility above the minimum acceptable return. As Figure 1 illustrates, if the MAR is set at 10%, downside deviation

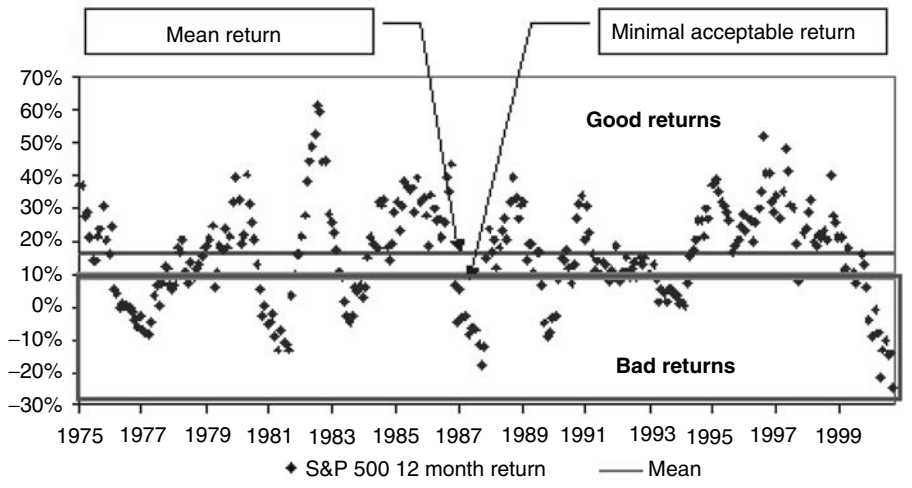

FIGURE 1
Minimum Acceptable return (MAR).

measures the variation of returns below this value.

The formula for downside deviation can be expressed as follows:

$$\text{Downside Deviation} = \left(\left(\sum_{I=1}^{N} (L_I)^2 \right) \div N \right)^{1/2}$$

where R_I = Return for period I; N = Number of periods; R_{MAR} = Period minimum acceptable return; $L_I = R_I - R_{\text{MAR}}$ (If $R_I - R_{\text{MAR}} < 0$) or 0 (If $R_I - R_{\text{MAR}} \geq 0$).

When comparing investments, a lower value for downside deviation is considered better.

Drag-Along Right

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This contractual right, most commonly contained in the company's shareholders' agreement, enables the majority shareholder (usually holding more than 75% in nominal value) to "drag" the minority shareholders into a specific action, such as selling their shares to the same purchaser. The majority shareholder must give the minority shareholders who are being dragged into the deal the same price, terms, and conditions as any other seller. The right is intended to be a protection of the majority shareholding venture capitalists. Some purchasers may be exclusively seeking to gain complete ownership of a company, in which case the drag-along right helps the venture capitalist to realize the deal by eliminating the minority shareholders and sell 100% of the shares to the purchaser. As a result, founding partners or entrepreneurs could lose their companies. At the same time, the right ensures that the minority shareholders get the offer under the same conditions. The drag-along right, along with other stringent investor rights, has gained more importance after the era of poor deal structuring in 1999 to 2000 and is now a common prerequisite to concluding any new investment. Not many venture capitalists today will be willing to forgo the drag along right in their contracts.

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Drawdown

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Drawdown is a metric used in risk-management, particularly for hedge funds and fund of funds. The drawdown measures the distance between a historical peak of an investment portfolio over a prespecified period and the current portfolio value. The drawdown is often expressed in percentage of the current portfolio value. Formally, if V_t is the value of the portfolio at time t, the drawdown δ_{tT} at time T measured over a time interval $[t, T]$ is defined as

$$\delta_{tT} = \frac{\max_{s \in [t,T]}(V_s) - V_T}{V_T} \qquad (1)$$

As becomes clear from its definition in Equation 1 the drawdown δ_{tT} is strictly nonnegative.

To use the drawdown defined in Equation 1 as a risk-metric, we often look at the maximum drawdown, which is defined as

$$\delta_{tT}^{\max} = \max_{s\in[t,T]}(\delta_{ts}) \tag{2}$$

In addition, the average drawdown

$$\delta_{tT}^{\text{avg}} = \frac{1}{T-t}\sum_{s=t}^{T}\delta_{ts} \tag{3}$$

may also provide some additional information on the nature of the risk underlying the investment portfolio.

To clarify the concept behind the above drawdown measures we simulate in Panel 1 of Figure 1 the evolution of a hypothetical portfolio over 10 periods. In Panel 2, the solid line represents the different drawdowns δ_{0T} as defined in Equation 1 for each time instance $T = 1, \ldots, 11$. The maximum drawdown defined in Equation 2 of 21.6% is marked with a star. The dashed horizontal line represents the average drawdown defined in Equation 3, which is 7.2% for the period considered.

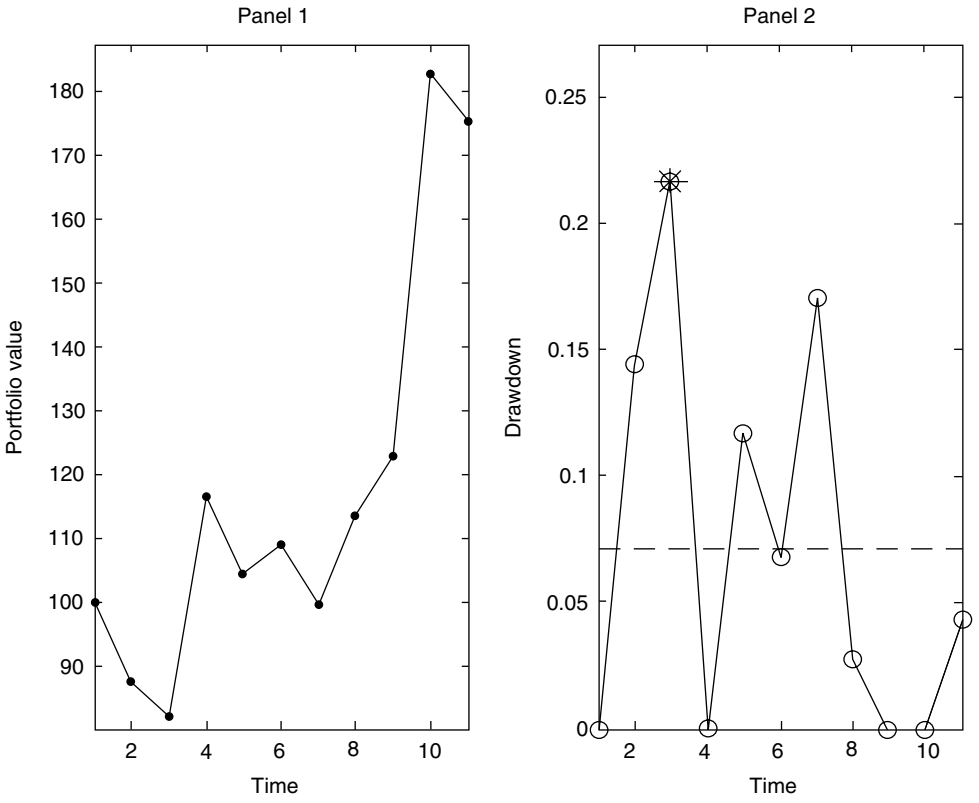

FIGURE 1
Portfolio value, drawdown, maximum drawdown, and average drawdown.

Due Diligence

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Due diligence is quantitative and qualitative investigation and verification into the business practice, operations, financial statements, and legal details of a prospective business client or associate. This process is generally done prior to a business relationship being established; however, routine investigations of existing relationships can also be beneficial in uncovering pertinent information. A due diligence investigation reduces risk associated with conducting business with other individuals or companies by ensuring their credibility and accurate portrayal (Calhoun, 2007). These examinations may expose disparaging details that could ultimately hinder a business affiliation (Calhoun, 2007). Failure to conduct proper due diligence can lead to false representation of a party involved in a relationship, potential monetary loss, as well as litigation (Calhoun, 2007).

Due diligence is of great importance in the hedge fund space with the lack of transparency and regulation. A major characteristic of these private investment vehicles is that they have an aversion to divulging information on investment processes and market positions (Lhabitant, 2001). Proper due diligence may mitigate some of these information asymmetries as well as protect an investment.

This process has numerous components and can include (but not limited to):

- Credibility assessment of the particular company and executives
- On-site visitation and verification of internal control systems
- Independent research for any publicly printed information about the company and officers
- Research and overview of third-party service providers
- Check of past, pending, or current litigations
- Overview of financial statements

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Dutch Auction

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In a Dutch auction, the auctioneer begins with a high asking price and gradually lowers the price until a buyer accepts the current price. Thus, in contrast with the English or ascending price auction, where multiple bids can be observed, for a Dutch auction the first bid is the only bid (Vickrey, 1961). A common example of this kind of auction is the Dutch wholesale flower auctions and treasury auctions by the United States Department of Treasury for all T-bills, notes, and bonds.

Bidding behavior in a Dutch auction depends on the reserve utility of the first

bidder and his/her information about the probability of other bids. Reserve utility is his/her subjective valuation of the good being auctioned. If he/she bids as soon as the price falls to his/her reserve utility, he/she maximizes the probability of winning the item, but minimizes his/her surplus, that is, the difference between the winning bid and his/her reserve utility. If he/she waits longer for prices to fall further, he/she increases his/her surplus but reduces his/her probability of winning the item. Accordingly, other bidders will behave based on their expectation about the first bidder's behavior.

Noble Laureate economist William Vickrey has shown that under a set of assumptions both the progressive price English auction and the regressive price Dutch auction results in the same average expected price and gains for the buyers and the sellers. The variance of the price, however, is smaller for the Dutch auction by a factor of $(N - 1)/2N$ than the English auction where N is the number of bidders. The variance of the gain by the winning bidder is smaller by a factor of $1/N^2$ in case of a Dutch auction (Vickrey, 1961). Hence, for risk-averse buyers and sellers, Dutch auction is slightly better than the English auction because of the smaller variance of gains.

Vickrey further argues that where bidders are fairly sophisticated and homogeneous, that is, they have similar information and bidding strategies, the Dutch auction may produce results that are close to Pareto-optimal case of English auction. The term "Pareto-optimal" suggests that an alternative allocation (than the existing one) where one bidder is better off without making at least one bidder worse off is not possible for the good being auctioned. Where the bidders have different set of information or are less sophisticated, Dutch auction may produce higher price and lower average surplus for the buyers relative to the Pareto-optimal English auction and can be relatively inefficient from the bidders' point of view. Similarly, there are other extremes where Dutch auction produces lower price and may be inefficient from seller's perspective.

Despite the complexity of the Dutch auction process and the optimization problem faced by the bidders due to the tradeoff between maximizing the surplus or gain from winning and the probability of winning the auction item, Vickrey argued and Milgrom further elaborated that the task of a bidder in a Dutch auction is similar to that of a bidder in a sealed bid auction (Milgrom, 1989). In a sealed bid auction, the seller sells the goods to the highest bidder at his/her own bid. Milgrom argues that in both cases the bidder's choice is to determine the price at which he/she is willing to obtain the good. In case of a Dutch auction, the bidder starts with the highest price he/she is willing to bid. When price drops to that level, the bidder has the option to bid or to wait. If he/she chooses to wait, he/she updates the highest price he/she is willing to bid at that point based on the latest information. This process is repeated and can be summarized into a single price that the bidder is willing to pay. Hence, the Dutch auction and sealed bid auction should result in the same selling price.

In the same article, however, Milgrom suggests that in laboratory experiments where stakes are low, the above prediction does not hold. In these experiments, winning bidders in a Dutch auction on average pay a lower price than the sealed bid auction. He postulates that the design of a Dutch auction discourages the bidders from advance planning and hence results in lower price. Other alternatives suggested by him are (1) the bidders in these experiments are

not maximizing utility, and (2) the lower stakes in the experiments encourage bidders to wait longer before bidding.

The term "Dutch auction" used in connection with share repurchase or Initial Public Offering (IPO) share allocation has a different mechanism. Bagwell (1991) describes the Dutch auction method for share repurchase. The buying firm in such auction specifies a range of prices at which shareholders can offer to sell their shares. Selling shareholders indicate the reserve price or the minimum selling price he/she is willing to accept and the quantity available at that price. The buyer aggregates the supply quantity and constructs the supply curve. The lowest price at which the demand of the repurchasing firm is fulfilled is paid to all sellers who are willing to sell at this price or below.

According to a study by Comment and Jarrel (1991), share repurchase with a Dutch auction pays lower premium (relative to the open market price) than a fixed price repurchase but the number of shares demanded is also lower in the former case. They also find that Dutch auctions are preferred by large firms that are transparent in terms of information.

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Dynamic Asset Allocation

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Dynamic asset allocation is the process of constantly adjusting the mix of assets, such as stocks, bonds, real estate, and cash, in response to changing market conditions, with the aim of optimizing the risk/reward tradeoff, based on an investor's or an institution's exact situation and goals. Usually, the goal is to get a positively skewed distribution of returns, giving up some value on the upside (or guarantee) for downside protection. Therefore, similar to traditional static asset allocation, dynamic asset allocation strategies aim to diminish risk through diversifying among various investment classifications. Investors choose investments based on classifications having the largest potential for higher returns, due to existing market conditions. This is typically done on a quantitative basis.

A rather general scheme for dynamic asset allocation strategies is the following.

The investment universe (in principle any reasonably liquid security, for example, futures contracts, stocks, bonds, mutual funds, ETFs) is divided into two sets: risky assets and risk-free assets. Risk-free assets are typically represented by short-term domestic bonds. Let us denote with $w(t)_{\text{Risky}}$ and $w(t)_{\text{Risk-Free}}$ the vectors of weights at time t of the risky and risk-free assets, respectively. A typical dynamic asset allocation strategy defines the vector $w(t)_{\text{Risky}}$ as a function ψ_t of an information

set about current and past market conditions, denoted as $I(t)$:

$$w(t)_{\text{Risky}} = \psi_t(I(t)) \tag{1}$$

Once $w(t)_{\text{Risky}}$ is derived from Equation 1 given a budget constrain such as

$$w(t)_{\text{Risky}} + w(t)_{\text{Risk-free}} = 1$$

the value for $w(t)_{\text{Risk-free}}$ is easily derived. Note that the function ψ_t can depend on time, as some parameters of the function tend to vary over time.

Dynamic asset allocation includes portfolio insurance strategies, for example, constant proportion portfolio insurance (CPPI) schemes—a very popular, flexible, and a general way to implement asset allocation in a dynamic fashion (see Black and Jones, 1987; Corielli and Penati, 1995). CPPI consists of a dynamic trading strategy that works according to the following approach (assuming for the sake of simplicity that we deal only with two assets, a single risk-free asset and a single risky asset)

$$\begin{aligned}\text{Risky}(t) &= w(t)_{\text{Risky}} \cdot p(t)_{\text{Risky}} \\ &= \min[\max[m(t, I(t)) \cdot (\text{Portfolio}(t) \\ &\quad - \text{Floor}(t)), \text{LB}], \text{UB}]\end{aligned} \tag{2}$$

where Risky(t) is the value of the risky subportfolio at time t; $p(t)_{\text{Risky}}$ is the price of the risky asset; Portfolio(t) is the total value of the portfolio; Floor(t) is the present value of all cash flows due in the future (for example, a notional guarantee at future date), represented by a zero coupon bond (or a set of zero coupon bonds); it can be even a 'normal' or reference portfolio, for example, a fixed portfolio representing a strategic asset allocation; $m(t, I(t))$ is a multiplier that defines the amount of leverage allowed with respect of the surplus Portfolio(t) − Floor(t) or risk capital, known as 'cushion'; LB and UB are, respectively, the lower and upper bound for the risky asset position.

For example, if we consider a long-only portfolio whose current value is 100, with $m(t, I(t))$ kept fixed to 3, and the floor equal to 90, with LB and UB, respectively, equal to 0 and 100, then according to Equation 2 the value of the risky subportfolio is $3 \times (100 - 90) = 30$, and the risk-free investment is $100 - 30 = 70$. Note that the bond floor is the value below which the portfolio value should never fall to be able to ensure the due future payments.

The leverage factor $m(t, I(t))$ is often designed as a decreasing function of conditional volatility that represents the information set $I(t)$. This means that, in presence of rising volatility, the amount of capital allocated to risky assets might be reduced. The leverage factor can also keep into account valuation information (e.g., market aggregates for Price/Earnings), or macroeconomic forecasts.

Quite often CPPI portfolios are capital guaranteed products, but the algorithm (Equation 2) can be used in a rather creative way: for example, to manage core-satellite portfolios, where the floor is a core asset allocation (e.g., common stocks and bonds) and the portfolio is allowed to invest in satellites (e.g., alternative investments).

Another dynamic asset allocation strategy is option replication or option based portfolio insurance (OBPI). See Hull (2005), Luskin (1988), and Corielli and Penati (1995). In fact, a portfolio of stocks or bonds and options can deliver a positively skewed distribution of returns. For example, a zero coupon bond coupled with a call option

allows the investor to protect the principal (via the zero coupon bond) while capturing some market upside (through the call). As the call option can be replicated by investing in the underlying an amount equal to the delta of the option, $\delta(t)$, the investor can get the asymmetric distribution mimicking the original portfolio through this trading strategy. It can be shown that CPPI is a simplified version of OBPI. Both CPPI and OBPI are strategies that constantly adjust the mix of assets as markets rise and fall. With these strategies investors sell assets that are declining and purchasing assets that are increasing, making dynamic asset allocation sensitive to liquidity risk: the strategy might as well force the investor to buy or sell with poor volumes, or when securities are squeezed. In fact, during past market crashes, many funds managed using dynamic allocation strategies did poorly due to their difficulty in executing trades to adjust their hedges as the market dropped. For this reason, it is suggested to implement portfolio insurance through liquid assests, like futures, that will reduce the market impact. It is also important to calibrate in an accurate way rebalancing rules to minimize turnover and transaction costs (see Scherer, 2007).

Alternative approaches for dynamic asset allocation are:

- myopic portfolio strategies, for example, repeatedly investing in one-period-efficient portfolios;
- stochastic programming, relatively popular for asset liability management (ALM) purposes;
- dynamic programming (stochastic control).

One could speculate why dynamic asset allocation works. A number of factors render dynamic asset allocation a well-liked and a viable strategy:

- financial markets tend to exhibit local trends (the 'momentum' effect or autocorrelation of returns and volatility clusters) and move in cycles;
- some dynamic schemes based on myopic portfolio strategies, implemented by some market professionals, are based on market signals produced on a regular basis with some predictive power;
- dynamic strategies are linked to the concept of option replication and arbitrage-free markets, that is, it is possible to get a given distribution of returns or a terminal payoff through asset allocation between stocks and bonds without trading options.

Dynamic asset allocation is a key concept in money management, and is extensively used by hedge funds, mutual funds, and structured products, such as principal protected notes (also known as guaranteed linked notes) as a useful mechanism that can provide downside protection.

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E

Early Redemption Policy

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The early redemption policy refers to a charge levied to an investor that redeems units of a fund before a specified date. Early redemption penalties aim to discourage short-term trading in a fund. There is generally a lockup period that may last several years until the first redemption. The units issued by a fund that follows an early redemption policy are thus illiquid for some laps of time after being issued. After the lockup period, there is a predefined schedule of redemptions dates with their corresponding penalties. Some hedge funds also retain the right to suspend redemptions under exceptional circumstances. By lengthening the lockup period, hedge funds obviously seek more stable financing facilities and want to protect themselves from sudden withdrawals by investors. To illustrate this point, we examine the prospectus of managed futures notes issued by the Business Development Bank of Canada (BDC) on March 27, 2003 and which mature on February 28, 2011. There is a lock-up period lasting until June 30, 2005. Thereafter, the redemption fees follow a step function. Redemption is allowed every year on June 30 and on December 30 and the fees decrease from 4 to 2% until December 31, 2007. Thereafter, they are nil until the expiration of the notes. Obviously, BDC wants to discourage withdrawals from 2005 to 2007 and the imposed penalty is higher, the nearer the redemption is from the date of issuance of the notes.

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Early Stage Finance

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Early stage finance encompasses any financing transaction or support operation (not exclusively financial) undertaken to benefit companies in the seed and start-up phases. At a global level, early stage financing is considered a key to innovation. However, it must also be stressed that several problems arise in implementing solutions. Specifically, financial players are unanimous in asserting that early stage projects are usually too expensive to investigate and too risky. At the same time, entrepreneurs in general are badly trained to appreciate the teamwork and leadership as well as sales competence required.

Corporate development can be summarized in four phases:

- Preparation—excogitating a business idea, running feasibility studies, presenting the idea to the team of "colleagues"
- Start-up—creating the company, team building, setting up production activities, marketing, selling
- Growth—defining the organizational structure of the company, creating various supply/sales channels, growing the team, internationalizing, penetrating new markets
- Exit—liquidating partially or totally the work of the original promoters

Again, ideally speaking, various financial needs may be associated with these phases; specifically, early stage financing addresses two of them:

- Preparation—pre-seed or seed. Normally the financial needs that arise here are negligible. In fact, the promoters of the initiative are the ones who take on these expenses personally, or in some instances together with their families or friends. In recent years, an increase in specialized public funds for this kind of venture has been seen, along with the appearance of specialized financial intermediaries, often "spin-offs" of venture capitalists attracted by the chance to finance these companies/projects during later phases.
- Start-up—development financing. Here more substantial capital is required which is invested directly in the company's operations. In this phase, in addition to financial requirements, the need for competencies and skills must also be satisfied which help the entrepreneurial initiative along its development path.

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Economically Deliverable Supply

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The economically deliverable supply is that fraction of the deliverable supply of a commodity that is in position for delivery against a future contract, and is not otherwise unavailable for delivery (see Pirrong, 2001). For example, oil that is held by a country for resources for crises is not considered part of the economically deliverable supply of oil futures contract. Another example is grain of a farmer. Assume that a portion of the grain is held by the farmer for his own cattle. This portion is not economically deliverable because it is captive and so unavailable for delivery as a part of a futures contract. The deliverable supply consists of the captive portion and of the portion that is part of the futures contract. Therefore, the economically deliverable supply is always equal or less than the deliverable supply. The economically deliverable supply can explain in comparison with the deliverable supply futures price reactions. When it is significantly less than the amount needed to fulfill the short position of a contract, the futures price may increase. That is the reason why futures contracts are closed nearby the delivery month. For example, the holder of a long position can close his position with a countertrade and realize profits because of the risen price.

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EDHEC Alternative Indexes

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Alternative investment strategies are often referred to as "absolute return" strategies. One could consequently argue that developing hedge fund indexes does not make sense. However, recent research has highlighted that the exposure of hedge funds to multiple risk sources (volatility, default, etc.) and the dynamic character of their management make mono- and multilinear factor models inadequate for evaluating their performance. A pragmatic alternative to developing factor models involves comparing the return of a given fund to that of a portfolio of funds following the same strategy (peer benchmarking), or to that of a representative index (index benchmarking). The difficulties related to the development of indexes, which are already evident in the traditional universe, are exacerbated in the alternative investment world. Finding a benchmark that is representative of a particular management universe is not a trivial problem.

In response to the needs of investors, the EDHEC Risk and Asset Management Research Center has proposed an original solution by constructing an "index of indexes," the EDHEC Alternative Indexes. The aim of the methodology used to construct this *index of indexes* (see Amenc and Martellini, 2002) was to construct a benchmark which is more representative and stable than the indexes provided by Altvest, CSFB/Tremont, EACM, Hennessee, HF Net, HFR, MAR, Van Hedge, Zurich, etc.

(the competing indexes). As a noncommercial initiative and in order to facilitate access, the EDHEC indexes may be downloaded from the EDHEC research center website www.edhec-risk.com at no charge. EDHEC has received support from Alteram for the promotion of its alternative indexes.

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EDHEC CTA Global Index

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EDHEC produces the EDHEC CTA Global Index by combining five of the most significant CTA indexes in the CTA universe: (1) CISDM CTA, (2) CSFB-Tremont CTA, (3) S&P Managed Futures Index, (4) Barclay CTA, and (5) Hedgefund.Net's Tuna CTA index. This universal index is considered by many as a comprehensive and complete collection of CTA indexes. The main idea and unique feature behind this index is its weighting method. By using principal component analysis, Amenc and Martellini (2002) obtain weights selected for each of the above CTA indexes and make sure that no other linear combination of other CTA indexes leads to a lower information loss, while minimizing the extent to which each index's bias affects the EDHEC CTA Global Index.

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Eligible Contract Participant

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The Commodity Exchange Act takes almost two pages to define eligible contract participant (ECP). There are many entities that qualify to be called an ECP. The basic idea is that they are in some way more sophisticated than the rest of us, need less protection, and thus can trade on less-regulated markets such as Derivatives Transaction Execution Facilities and Exempt Boards of Trade. There are actually not many of these less-regulated markets. At the moment there are none of the first and six of the second. Entities typically qualify as ECPs based on the nature of their business and/or the amount of assets that they own or control, but ultimately a specific entity is an ECP only if that type of entity is on the list.

ECPs currently include financial institutions, insurance companies, investment companies, commodity pools with assets exceeding $5 million and operated by a regulated person, other entities with total assets exceeding $10 million or with assets exceeding $1 million and trading only for risk management purposes, employee benefit plans, government entities, supranationals

(such as the World Bank), SEC-regulated brokers and dealers, associated persons of such brokers and dealers, futures commission merchants, floor brokers and floor traders, individuals with assets in excess of $10 million, and anybody else the CFTC may throw into the definition. For example, floor brokers and traders who are guaranteed by a clearing member of their exchange were added to the list in about 2003 based on a petition from one of the markets. Note that there is also an eligible commercial entity (ECE), whose name is unfortunately close to and confused with ECPs. The difference is that the ECE category is a subset of ECPs having a commercial connection and the ability to make or take delivery of the underlying commodity.

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Commodity Exchange Act: Section 1a (11) gives the definition of Eligible Commercial Entity.
Commodity Exchange Act: Section 1a (12) gives the definition of Eligible Contract Participant.

Enumerated Agricultural Commodities

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The commodities specifically listed in the Commodity Exchange Act are wheat, cotton, rice, corn, oats, barley, rye, flaxseed, grain sorghums, mill feeds, butter, eggs, *Solanum tuberosum* (Irish potatoes), wool, wool tops, fats and oils (including lard, tallow, cottonseed oil, peanut oil, soybean oil, and all other fats and oils), cottonseed meal, cottonseed, peanuts, soybeans, soybean meal, livestock, livestock products, and frozen concentrated orange juice. Designated contract markets (DCMs) must submit to the CFTC and receive CFTC approval prior to implementation of all new rules and rule amendments that materially change the terms and conditions of contracts on commodities enumerated in Section 1a(4) of the Commodity Exchange Act (CEA) (Commodity Exchange Act, 1936), 7 USC 1a(4). This will also apply to contracts with open interest (CFTC).

In 1936, the U.S. Congress prohibited options trading in all commodities regulated under the Commodity Exchange Act. The prohibition was a response to a history of manipulation and price disruption in the futures markets attributed to options trading. The prohibition applied to all the "enumerated" agricultural commodities named in the 1936 Act. In subsequent years the list of enumerated commodities grew.

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Equal Weighted Strategies Index (HFRX)

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An equal-weighted strategies index is composed of hedge funds characterized by different investment strategies. Each strategy group is given the same weight in the index

portfolio. The covered investment strategies may be the same as in a global hedge fund index. This is for example the case with the HFRX Equal Weighted Strategies Index (Hedge Fund Research Inc., 2007a).

An equal-weighted strategies index can be regarded as a special case of a global hedge fund index with static index weights. These static weights may eventually cause some shortcomings. In contrast to global hedge fund indices where the different strategies may be asset weighted according to the market capitalization of assets in the hedge fund industry, the weightings of the strategies in an equal-weighted strategies index are not in accordance with the true representation of the different strategies in the hedge fund universe. The static weightings of the individual strategies in the index may also lead to the problem that it becomes difficult to react to changing market conditions. A global hedge fund index offers more dynamic possibilities to react to changes in the hedge fund market/peer group and to changes in the importance of different strategies represented in the hedge fund universe. The static weightings of an equal-weighted strategies index prohibit this adaptability and flexibility.

Besides its problems, an equal-weighted strategies index can also have positive side effects. In the case of an equal-weighted strategies index, there are no large strategy classes that dominate the index and that could cause a bias toward these strategies, see e.g. Brooks and Kat (2001). For example, the HFRX Equal Weighted Strategies Index is meant to be characterized by a more balanced diversification and a historically lower volatility (Hedge Fund Research Inc., 2007b). This results in an enhanced attractiveness of such indices for investors. Another advantage concerns the heterogeneity of hedge funds. One important problem in the hedge fund industry is that, due to the large influence of the individual portfolio manager's skills on hedge fund performance and due to manager specific investment strategies, even in the same strategy grouping, the hedge fund characteristics may be very different. In this case, an asset weighting of the different strategies may be disadvantageous and may lead to new distortions. In such a case an equally weighted strategies scheme could be preferable.

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Equally Weighted Index (HFRX)

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As the name implies, equally weighted indices are indices where all components receive the same weight during each measurement period. Equally weighted indices have been one of the first attempts to address some of the perceived flaws of asset-weighted indices.

Equally weighted indices are widely used in the world of hedge funds because their calculation is remarkably straightforward

and requires limited datasets. One just has to sum the performance of the N hedge fund managers that constitute the index and divide the result by N to obtain the index performance. There is no need to track the assets of each individual hedge fund month after month (as required in an asset-weighted index) and no need for using more complex averages. This explains why the majority of hedge fund indices are equally weighted.

Equally weighted indices provide a clear indication of the average percentage performance of their constituent funds. However, their apparent simplicity also comes with several shortcomings:

- *Emphasis on smaller funds.* Equally weighted indices consider the performance of small and large hedge funds the same way—each of them receives an identical weight in the index. By contrast, in an asset-weighted index, larger hedge funds would receive a larger weight. Supporters of equally weighted indices often argue that this is an advantage because the resulting index is less concentrated and avoids being driven by the largest funds. However, reality is often that investors feel more comfortable and are willing to invest in larger established funds.
- *Constant rebalancing.* The returns of an equally weighted hedge fund index are not representative of the returns of a buy and hold strategy. Indeed, as soon as the value of one index component changes, the index is no longer equally weighted and requires some rebalancing. Theoretically, one would need to constantly rebalance the index to maintain an equal-weighted approach. While this is easy to do in theory, it is often harder to implement in practice as the underlying hedge funds may not authorize in and out movements on a monthly basis. Thus, the challenge facing any index provider is determining the adequate rebalance frequency.
- *Contrarian strategy.* Rebalancing an equally weighted index is often counterintuitive in terms of investment strategy because one needs to sell winners (funds that performed well) to buy back losers (funds that underperformed). In practice, investors tend to allocate more to funds with a better performance.

Equity Hedge

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The equity hedge strategy is considered as the most important one followed by hedge fund managers. According to statistics published in 2003 by the Hedge Fund Research (HFR), the market share of equity hedge funds is approximately 29% of the total universe. Following the HFR definition, equity hedge investing consists of holding long equities hedged at all times with stocks and/or stocks index options. The equity hedge strategy is commonly called a "long–short" strategy, being the oldest strategy of the hedge fund industry. Despite this definition, these funds may have a market exposure. For instance, over the period 1997–2005, hedge funds from the HFR database following an equity hedge strategy had a CAPM beta, computed using the S&P500 as benchmark,

equal to 0.52. This demonstrates that equity hedge funds have only a portion of their assets that is hedged. Some equity hedge funds also use leverage to magnify market exposure. According to Lhabitant (2006), the sources of profit of long–short funds deviate from the traditional investing that is based on capital gains. There are four sources of gains for an equity hedge fund: the spread between the long and the short position; the interest rebate on the proceeds of the short sale that are used as collateral; the interest paid on the margin deposit to the broker; the spread in dividends between the long and the short position. The spread between the long and the short position is often obtained by buying undervalued securities and selling overvalued securities. These are stock-picking activities and are related to a selectivity strategy that may be based on the securities' relative Jensen alphas. Furthermore, equity hedge funds can invest in securities other than equities (HFRI, 2005).

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Equity Market Neutral

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As indicated by its name, the manager of this strategy wants to maintain a neutral exposure to the stock market. For instance, over the period 1997–2007, the CAPM beta of the market neutral hedge funds, computed using the S&P500 as benchmark, was only 0.03. These hedge funds thus seek to maintain their beta near 0 by combining long and short transactions on equities. The gross market exposure (E_G) may be defined as

$$E_G = \left(\frac{L+S}{K}\right) = \left(\frac{L}{K} + \frac{S}{K}\right)$$

where L stands for the long position, S for the short position, and K for the capital invested. Practitioners also use what is called "net market position" which may be defined as

$$E_N = \left(\frac{L-S}{K}\right) = \left(\frac{L}{K} - \frac{S}{K}\right)$$

For instance, a manager who has a long position of 80% of his portfolio and a short position of 40% has a gross total market exposure of

$$\frac{L}{K} + \frac{S}{K} = 80\% + 40\% = 120\%$$

in terms of his capital invested. This means that 120% of his capital is related to the market. However, the net exposure, which is a measure of the real exposure to the market, would be in this case equal to

$$\frac{L}{K} - \frac{S}{K} = 80\% - 40\% = 40\%$$

The degree of exposure of this manager to the market variations is thus 40%. It also means that even if his position is covered, he has a net long position. This implies that the return of his portfolio will be sensitive to the whole market. Besides, one can neutralize the beta of his portfolio by equalizing the weighted beta of the long position to the weighted beta of the short position. A problem here is that the beta is a very volatile measure and many managers are not able to neutralize perfectly the beta of their portfolio (Capocci, 2004; HFRI, 2005).

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Event Driven

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"Make money on events." Event-driven strategies invest during special events in the life cycle of a corporation. Such special events can be bankruptcies, reorganizations, mergers and acquisitions, spin-offs, and share buybacks. During these events, stock prices are mainly driven by the event and not by the market. An event-driven manager evaluates the probability of the event and the outcome of the event. Thus, he needs knowledge of how the security will behave depending on the outcome of the event. In addition, fast and reliable access to information is required. Therefore, most event-driven managers are specialized in certain industries. The most popular event-driven strategies are distressed securities investing and risk arbitrage. The latter usually includes merger arbitrage and special situations.

The distressed securities strategy identifies firms in financial or operational distress, usually linked with extreme price losses. Specialized in pricing securities in such extreme events, managers buy adequate stocks or bonds. Some managers practice an active strategy and take a hand in reorganizations while others follow a passive buy and hold strategy.

Merger arbitrage is usually based on the empirical observation that stocks of the target rise after an announcement because of a premium included in the bid price. While some invest on the basis of rumors before the bid, others bet after the bid on the outcome.

Special situations include rearrangements of stock indices, spin-offs, and share buybacks, for example, when a stock enters a big index, empirically there is a high probability of a price increase. The same is true when a share buyback is announced. At spin-offs, situations of negative stub values are of special interest.

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Evergreen Fund

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An *evergreen fund* is a pool of capital that certain private equity and venture capital firms maintain and replenish with the proceeds from successful investments. Investors are paid through distributions when the pool becomes large enough; should they seek liquidity before that, their share of the capital pool can be sold to another investor through a private transaction. This approach to managing a firm contrasts with that used by most private

equity and venture capital firms in the United States in which a series of funds, limited in both time and money, are raised. These firms typically raise a new fund every 3–5 years, and commit to liquidate the fund as well as return all capital and any profits within 10 years, which fits the needs of institutional investors who seek periodic liquidity (Sahlman, 1990). While evergreen funds are uncommon in large American firms, there are notable exceptions such as Sutter Hill Ventures (Gupta, 2000). Proponents of evergreen funds point to a major advantage: having only one capital pool means less time is spent fundraising and managing investors, allowing more focus to be put on finding and mentoring successful ventures. Evergreen funds are also commonly used by corporate venture capital firms that work with a capital pool provided by their parent corporation, and by government agencies that set up or sponsor venture capital funds to encourage regional development.

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Excluded Commodities

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The Commodity Exchange Act (CEA) defines excluded commodities as instruments that are not manipulable or influenceable by any party and thus are excluded from CEA regulation. They include any financial instrument such as an interest or exchange rate, currency, security, credit risk or measure. Apart from that, excluded commodities also include any other rate that is only based on commodities without cash markets. Also part of the definition of excluded commodities is an occurrence or contingency with a relevant consequence, but without the control of any party involved in the contract (CFTC, 2007).

Usually, the CEA regulates the trading of commodities to protect investors against fraud and to deter market manipulation. In 1999, The U.S. President's Working Group on Financial Markets (PWG) concluded that commodity trading should be subject to CEA regulation only if it is necessary to ensure the achievement of public policy objectives (Parkinson, 2000). Accordingly, amendments regarding a more flexible structure for the regulation of futures and option trading have been established in the course of the Commodity Futures Modernization Act 2000. Since excluded commodities are usually large in scale, they are not considered to be susceptible to manipulation or influence of any interested party. Apart from that, professional counterparties are able to protect themselves against fraud. Thus, excluded commodities were excluded from regulation under some further conditions: eligible contract participants have to enter into the contract, the transaction has to be accomplished on an electronic trading facility, and trading must be on a principal-to-principal basis. As a result of these amendments, a broad range of over-the-counter derivative transactions are excluded from CEA regulation (Kloner, 2001).

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Exercise Option

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The holder of an option contract may decide to exercise the option at the exercise or strike price if the contract is in the money. Exercising indicates that transaction of the asset takes place at the predetermined exercise price and the contract is terminated. For a European type option, holder of the contract can decide to exercise the option only at the maturity. However, for an American type option, holder of the contract has the flexibility to exercise the option before the expiration date. For a call option, which gives the owner the right, but not the obligation, to buy an asset at the exercise price, the contract will be *in the money* when exercise price is below the spot price, and owner of the contract will decide to exercise the option to take delivery of the asset. For a put option, on the other hand, owner of the contract will decide to exercise his/her rights if exercise price is above the spot price.

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Exercise Price

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Exercise price, also called the strike price, of an option is the predetermined fixed per unit price at which the underlying asset is bought or sold if the option is exercised. This price once set never changes during the life of the option. The holder uses this price as a decision criterion when deciding to exercise the option (Kolb, 2000). If the exercise price provides a profitable opportunity then the holder will use the option. For example, in a call (put) option, the option will be exercised if the exercise price is less (greater) than the current market price of the underlying asset. In this case the holder of the option will have the opportunity to buy (sell) the underlying asset at a lower (higher) price than the market by using the option and have the opportunity to profit by selling (buying) the asset at a higher (lower) price at the market. In other words, the holder will exercise the option if it is in the money. Table 1 exhibits

TABLE 1

An Option in the Money, at the Money, and out of the Money

Option	Out of the Money	At the Money	In the Money
Call	$X > S_T$	$X = S_T$	$X < S_T$
Put	$X < S_T$	$X = S_T$	$X > S_T$

Note: X, exercise price; S_T, market price of the underlying asset.

when an option is in the money, at the money, and out of the money.

Options exchanges establish exercise prices so that they are set at levels above and below the market price of the underlying asset. Hence, these prices are standard except for stock options in case of a stock split or dividend. When the market price of the underlying asset moves out of the price series defined by the highest and lowest exercise prices, trading is introduced in an option with a new exercise price by the exchange (Hull, 2002, p. 167). The number of available exercise prices depends on the volatility of the underlying asset's prices. The more volatile the price movement, the more exercise price alternatives.

Exercise price is also one of the determinants of option value. The value of an option has two components as follows:

$$\text{Value of an option} = \text{intrinsic value} + \text{time value}$$

The intrinsic value of an option depends on the difference between the exercise price and the market price of the underlying asset. If an option is out of the money then its intrinsic value is zero.

$$\text{Intrinsic value} = \text{Max}[0, (\text{market price} - \text{exercise price})] \text{ for a } \textit{call option}$$

$$\text{Intrinsic value} = \text{Max}[0, (\text{exercise price} - \text{market price})] \text{ for a } \textit{put option}$$

The value of an option is always greater than its intrinsic value. Along the same lines a call (put) option with a lower (higher) exercise price will be more expensive than the call (put) option with the same characteristics but with a higher (lower) exercise price (Wilmott et al., 1998). The time value is also influenced by the relationship between the exercise price and the market price of the underlying asset. The options that are at the money have the greatest amount of time value.

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Exit Strategy

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Disinvesting and liquidating an equity position is the last phase in the process of investing in a company by a venture capitalist. In fact, typically venture capitalists make temporary investments that are linked to the performance of the companies in which they invest. The study of the exit phase is important because it represents the critical transition that enables the venture capitalist to realize a profit, or give monetary value to the commitment and activity undertaken to the benefit of the counterparty.

Beyond the principles that regulate the divestment process, or relational problems that one may encounter in defining the objectives of each party who participates in the transaction in various ways, in practical terms the main exit strategies available to a

private equity player are the following:

- To sell shares on a regulated market, either in the context of a placement through an initial public offering (IPO) or a placement after the listing (Post-IPO Sale)
- To sell shares to a partner in the industry (trade sale)
- To sell shares to another private equity player (replacement and secondary buy out)
- To repurchase shares, which can be done by the company and/or group of majority or minority shareholders (buy back)
- To reduce, totally or partially, the value of the shares without selling to third parties (write-off)

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Expiration Date

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The expiration date is the date when an option contract expires or may be exercised. This is also the last date when the futures contract trades. Expiration dates for exchange-traded contracts are not uniform, but are set by each individual exchange. The expiration date for stock options in the United States is usually the third Saturday after the third Friday of the expiration month. Trading in the option stops on the third Friday, but the option owner has the ability to exercise the option on the third Saturday, the day after expiration (Kolb, 2000). Many contracts have a quarterly expiration cycle; this convention is done in order to generate increased volume and associated liquidity in the contract. For options on futures contracts, the expiration date may be different because the expiration does not necessarily coincide with the delivery month identified in the option contract. In certain instances, the expiration date for a future option may occur previous to the delivery month of a futures contract by a few weeks (Natenberg, 1994). Several times per year equity options, equity index options, and equity index futures expire on the same date. These Fridays have become known as triple-witching days; the period before this expiration is typically marked by heavy trading in the contracts (Levinson, 2006).

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Extrinsic Value

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Extrinsic value is an expression used regularly to refer to options. It can be defined

as the difference between the price of an option and its intrinsic value. In this sense, the intrinsic value corresponds to the difference between the strike price of the option and the market price of the underlying asset (Hull, 1997), the meaning depending on whether it refers to a *Call* or a *Put*. The extrinsic value is also known as the time value (Kline, 2000), and can be defined as the amount of money that the purchaser of an option is prepared to pay in the hope that, over the lifetime of this financial asset, a change in the price of the underlying asset leads to an increase in the value of the option. In this way, the option premium can be considered as the sum of the time value or extrinsic value and its intrinsic value. To the extent to which it reflects the excess of the premium over the intrinsic value, the extrinsic value of the option decreases as the moment of expiry of the title approaches. This is because the extrinsic value of the option reflects the likelihood of the option moving into the money, due to which it will be greater the longer the time that remains before it expires.

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F

Factor Models

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In general, factor models are used to predict random variables Y, with the help of explanatory variables, X. The basic idea behind these models is the relation between the dependent and the independent variables. The independent variables constitute the factors that determine the dependent variables. The explanatory variables must be carefully selected, as they are to be the factors that influence the dependent variables. A linear factor model can be formulized as follows:

$$R_i = \beta_i + \beta_{i1}F_1 + \beta_{i2}F_2 + \cdots + \beta_{ik}F_k + \varepsilon_i$$

where R_i is the return of fund i, and F_1, F_2, …, F_k are the k factors that are claimed to influence the fund's return. We assume that there are n funds, $i = 1, 2, \ldots, n$. The beta coefficients β_{i1}, β_{i2}, …, β_{ik} reflect the sensitivities of the fund to specified factors. These coefficients designate the change in the return on the fund per unit of change in the specified factor. The error term ε_i capture all randomness in the relationship. A popular factor model known as the CAPM has only one factor, $k = 1$. Models with a unique factor are called single-factor models, whereas models with more than one factor are called multifactor models. For hedge funds and managed futures, certain multifactor models are available in explaining managed futures and hedge fund returns. The factors used are justified on the distinctiveness of hedge fund manager trading styles.

The single-factor model assumes that the factors are linearly related to fund returns, but nonlinearity of factor models is also possible. The linear multifactor model given above does not have the time dimension and is therefore static, but dynamic factor analysis is possible when the time dimension with subscript t is introduced.

The following technical assumptions must be satisfied to make use of estimation by the Ordinary Least Squares (OLS) method and statistical inference in factor models:

- The expected value of the error term must be zero, $E(\varepsilon_i) = 0, i = 1, 2, \ldots, n$.
- Factors and error terms should be uncorrelated, $\text{Cov}(F_j, \varepsilon_i) = 0, j = 1, 2, \ldots, k$.
- Error terms should not be autocorrelated, $\text{Cov}(\varepsilon_i, \varepsilon_j) = 0, i \neq j$.
- All error terms must have the same variance, $E(\varepsilon_i^2) = \sigma^2$.

Some additional assumptions of time series analysis such as stationarity of each series must be imposed for dynamic factor analysis.

Factor models are introduced in the literature to facilitate the interpretation of a voluminous data set to reveal factors determining fund returns. Multifactor models can be categorized into broad classes of macroeconomic (macroeconomic indicators like interest rate series are used as factors), fundamental (factors concerning securities or firms, like firm size or dividend yield are used), and statistical models. Factor models are helpful in making decisions on asset valuation and are extensively referred in portfolio theory.

The researcher must determine the appropriate factors in the analysis to produce a meaningful relationship. The coefficient of determination, R^2, can be used as a benchmark criteria to assess the goodness of fit. There are several serious attempts in literature to work out the main factors that explain the hedge fund returns. Agarwal and Naik (2004) use the factor model approach to figure out that hedge fund returns are attributable to risk factors consisting of indices representing equities (Russell 3000 Index, lagged Russell 3000 Index, MSCI World Excluding the USA Index, and MSCI Emerging Markets Index), bonds (Salomon Brothers Government and Corporate Bond Index, Salomon Brothers World Government Bond Index, and Lehman High Yield Index), Federal Reserve Bank competitiveness-weighted dollar index, and the Goldman Sachs commodity index as well as the three zero-investment strategies representing Fama-French's "size" factor (small-minus-big or SMB), "book-to-market" factor (high-minus-low or HML), Carhart's "momentum" factor (winners minus losers), and the change in the default-spread (the difference between the yield on the BAA-rated corporate bonds and the 10-year Treasury bonds) to capture credit risk.

In a similar study, Fung and Hsieh (2004, p. 19) explain the HFR fund of funds index with two equity risk factors (S&P 500, SC-LC), "... two interest rate risk factors (the change in the yield of the 10 year treasury, and the change in the credit spread), and three trend-following factors (the portfolio returns of options on currencies, commodities, and long-term bonds)." In a similar attempt, Schneeweis and Spurgin (1998) explain the hedge fund performance index with the independent variables of nominal and absolute values of the SP500, GSCI, SBBI, and USDX, the intramonth standard deviation of the SP500, GSCI, bond, and USDX, and the nominal value of the MLM index. Meredith and Figueiredo (2005) present a more detailed study of factor models to explain the returns for every strategy. The factors they use are small cap stock minus large cap stocks, value stocks minus growth stocks, winners minus losers, GSCI, Russell 3000 (with up to four lags), Citigroup high yield composite, MSCI emerging markets, Fed dollar weighted index, MLCBI, reserve moving average, and traded implied volatility (change in VIX).

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Fallen Angel

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Fallen angel stands as an expression defining a stock (or an investment grade bond), the price (the quality) of which has substantially fallen since its original issue (88 or lower for an investment grade bond).

Thus, fallen angels are considered as a type of junk bonds. The main difference lies in the fact that junk bonds are generally issued with ratings of 88 or lower. Many studies are devoted to the analysis of the announcement of a downgrade from investment-grade to high yield, creating a so-called fallen angel. This event seems to have the strongest impact on market reaction when investment grade status exhibits risks (especially credit risk).

To a certain extent, stocks defined as fallen angels behave like growth stocks, and, thus, should be considered by GARP (Growth At a Reasonable Price) investors. Empirical studies show that they tend indeed to generate positive average returns when they experience good news.

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Fast market conditions are categorized by heavy trading, highly volatile prices, and a great uncertainty about the equilibrium price. These conditions are often the result of an imbalance of orders and bid-ask spreads may be wider than normal, potentially much wider. Whenever price fluctuations in the pit are rapid and the volume of business is large, the pit reporter, upon authorization of the pit committee chairman or his designated representative from the pit committee, activates the "fast market" indicator clearly visible to the entire trading floor. The fast market labeling indicates that brokerage customers

cannot expect their orders will be executed at the best published prices when the market is trading fast. In the middle of a fast market, brokers may be unaware of the best execution price for their clients. However, a fast market designation does not nullify or reduce the floor broker's obligation for executive care to execute orders according to the terms of the order. Open outcry markets handle fast markets surprisingly well because a trader can change his previous bid or offer, simply by a hand signal and a verbal announcement. However, the danger of fast markets in open outcry is the increased risk of an out-trade. In contrast to this, the response time (elapsed time between the submission of a trading request and the system confirming or rejecting the action) of electronic matching systems, which normally do not generate any out-trades, decreases in fast markets as message traffic increases because of the rapid and numerous alternations of the bids and offers.

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Feed Ratio

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Feed ratio is the relationship between feeding costs and the dollar value of livestock. It is used in futures market to measure the profitability of feeding and selling animals as commodities. Feed ratio is measured by dividing the price of the animals used as commodity by the price of the grain required to feed them. Various feed ratios have been used extensively as a proxy for profitability since the first half of twentieth century. Moreover, since producers respond to expected profitability, feed ratio has been used as a predictor for future production levels in the relevant market (Enrique and Shumway, 1981; Meilke, 1977).

First hog/corn ratio charts, one of the most frequently used feed ratio type and equal to the number of bushels of corn equal in value to 100 lb of live hogs, were devised by Henry A. Wallace in 1915. Lower values of hog/corn ratio, high corn prices relative to pork prices, would indicate lower profitability of feeding and selling hogs. Naturally, lower profitability cause a decline in pork supply in near future. Similarly, higher values of hog/corn ratio reveal higher profitability and a rise in pork supply in the future.

Other frequently used feed ratios are as follows: steer/corn ratio, number of bushels of corn equal in value to 100 lb of live cattle; milk/feed ratio, the number of pounds of 16% protein mixed dairy feed equal in value to 1 lb of whole milk; broiler/feed ratio, the number of pounds of broiler feed equal in value to 1 lb of broiler; egg/feed ratio, the number of pounds of laying feed equal in value to one dozen eggs; and turkey/feed ratio, the number of pounds of turkey grower feed equal in value to 1 lb of turkey.

Feed ratios have been used to measure profitability of feeding and selling animals

for a very long time. The reason they work is that feeding cost usually represents more than half of the total production cost. If nonfeeding costs are relatively stable, livestock producers respond to higher than average feed ratios by increasing supply and respond to lower than average feed ratios by decreasing supply. However, even if we assume nonfeeding costs are stable, which might not be true, there is another major limitation of the feed ratio as a proxy of profitability. Profitability does not depend only on the feed ratio but also on the price of corn (or other feedstuff). Generally a higher feed ratio is required to represent a profitable situation when corn prices are low than when they are high. For example, while the level of 20 for hog/corn ratio represents a profitable hog business when the price of corn is $3, the minimum of 25 for hog/corn ratio might be needed for profitability when the price of corn is $2. Thus, although various feed ratios are time-honored measures of livestock production profitability, greater variability in the prices of feedstuff decreases their accuracy (Futrell et al., 2007).

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Filing Range

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Filing range is a range of prices in which a minimum and a maximum offer price are given. The pricing of an IPO begins at the time the IPO is filed. To go public, a company must register with the Securities and Exchange Commission (SEC) and file a preliminary prospectus containing basic information on the company and a summary of the offering. The issuer and its underwriter agree on a filing range and this price range is listed in the preliminary prospectus. Underwriters incorporate available information about the company at the time they set the filing range (Lowry and Schwert, 2004). The filing range reflects the information derived from due diligence and through the underwriter's long-term relationship with the issuer. Underpricing depends upon the location of the offer price, relative to the filing range contained in the registration statement (Benveniste and Spindt, 1989). When the underwriters are faced with high demand among investors, the offer price is adjusted to a point at or above the maximum price of the filing range. The IPOs priced above the filing range are expected to be more underpriced. When the underwriters are faced with low demand among investors, the offer price is adjusted to a point at or below the minimum price of the filing range. The IPOs priced below the filing range are expected to be less underpriced or even overpriced. The midpoint of the filing range is used to estimate the expected offer price (Hanley, 1993).

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Final Prospectus

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The final prospectus is the revised version of the preliminary prospectus (also called a red herring in the United States or a pathfinder prospectus in the United Kingdom), which a company that wants to sell its securities for the first time to public investors files with the appropriate regulatory authority such as the Securities and Exchange Commission (SEC) in the United States or the Financial Service Authority in the United Kingdom. The final prospectus is prepared after the regulatory authorities have verified that the information contained in the preliminary prospectus is adequate and complies with the relevant securities laws and stock exchange regulations. Generally, the regulatory authority may ask for additional information or further explanation to be provided in the final prospectus than what appeared in the preliminary prospectus. The regulatory authorities do not, however, guarantee either the accuracy or completeness of the final prospectus. The contents of the final prospectus may also reflect any clarifications deemed necessary as a result of the presentations, known as *road shows*, to investors. The final prospectus is the legal basis on which the securities in an initial public offering are sold. Aggrieved persons in a new issue of securities can take legal action against the issuing company and its advisers for misrepresentations and false statements that appear in the final prospectus. The final prospectus, unlike the preliminary prospectus, must contain the final pricing information (Draho, 2004).

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Financing Round

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Sometimes, new business ventures can be created with minimal cash contributions from savings, bank loans, and personal credit lines. More frequently, new ventures require substantial cash investment. Companies may require several rounds of financing at different stages of development to provide cash to get to the next stage of growth.

The first stage of financing (outside investments made by the entrepreneur) is called angel financing. Angel financing may occur very early in the life of a company. In fact, such financing (or at least commitments to provide financing) may occur before a business plan is formally developed and perhaps before a company is legally created. These investors are called angels because they

invest despite the high risk of failure at this nascent stage and often demand less favorable terms than would be expected by the investment risks present with the new company. Frequently, an angel is a relative or a friend of the entrepreneur. In any case, the investor relies heavily on the confidence in the entrepreneur in some cases more than the business prospects of the company.

The second frequently identified stage of venture capital finance is called seed capital. This is the earliest stage that venture capital funds will invest. By now, part of the management team should be in place. The business plan is not complete but key decisions have been made. A prototype product may be complete or may require seed capital to finish the product development. Seed capital is used to test the prototype with customers and perhaps begin to market the product.

The next venture capital state is the early stage investing. This investment is still early in the course of creating the new business and may provide funds to refine the prototype. The company prices and sells this beta prototype but revenues do not cover all costs. Production moves from the garage to the newly acquired manufacturing space. Most investors avoid making early stage investments because investments made this early frequently fail to develop and losses of some or all of invested funds occur frequently. As a result, early stage investors extract favorable terms. Entrepreneurs often have trouble ceding as much ownership as early stage investors demand, but experienced entrepreneurs realize that the early stage investors bear much of the risk of failure and must be motivated by a share of the upside potential to accept the risk.

The fourth stage of venture capital investment is called late stage financing. This stage generally requires more funds than either angels or earlier stage investors, but the risks of failure are considerably lower. By the time of the late stage financing round, the company should have substantial revenues and may have reached breakeven point. Rapid growth creates a need for cash that cannot be generated fast enough internally. Many venture capital funds invest in late stage venture funding.

The fifth stage of venture capital financing is called mezzanine financing. By now, the company may be producing and possibly distributing the second production version of the product. The company may be creating its own manufacturing facilities for the first time. The company may be seeking to expand internationally. Mezzanine financing is sometimes called bridge financing as the company grooms itself for sale. Mezzanine financing is frequently in the form of debt or preferred stock, although lenders often get options to buy stock or convert their interest into common stock.

The next stage of venture capital financing is often an initial public offering of equity. U.S. securities laws require a formal registration process (including substantial financial and risk disclosures). Not every new company issues publicly traded common stock. Instead, the entrepreneur may sell the operation to a larger competitor or a company in a related industry without registering securities and making a public offering. A strategic acquisition by another company may be the best way to maximize the potential created with the new company. This exit strategy may leave the entrepreneur with a smaller role to play in the combined company, which may or may not appeal to the management team.

These stages exist for the benefit of both the entrepreneur and the investor. Early stage

investors extract more favorable terms from entrepreneurs, so are often seen as expensive sources of financing (at least by the entrepreneur, who is convinced that the business will defy the odds of success). The stages also force some control or accountability on the entrepreneur because the company may be prohibited from additional financing until certain business milestones are achieved. Likewise, investing in stages also benefits the investors who have observed the past success ratio at different stages and have decided to limit their risk somewhat by investing in late stage companies.

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Firm Commitment

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The underwriter agrees to purchase the entire securities issue from the issuer. He/she will then resell them to institutional and individual investors. Hence, the underwriter will assume the market risk associated with the purchase of the entire issue. Any unsold securities will be held by the underwriter. This agreement is different from the best efforts deals, where the underwriter does not buy any of the IPO issue and does not guarantee that all the new securities will be sold. Welch (1991) notes, "In best-efforts offerings, minimum sales constraints permit issuers to precommit to withdraw the offering if a fixed minimum number of shares is not sold. In firm-commitment offerings, the over allotment option allows the underwriter to increase sales when demand is strong." Bower (1989) shows that the choice between firm commitment and best efforts affects both a firm's cost of obtaining capital and investors' perceptions about firm value.

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First Notice Day

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The first day notice is an announcement on the first day of the applicable period that a seller intends to deliver a commodity under a futures contract. Some exchanges require the first day notice to be given one day prior to the expected delivery date.

There are various reasons for investing in a futures contract. Depending on the investment goal, the first day notice can be either something that completes the transaction, or is a problematic event in an investment gone awry. Typically, the seller of a commodity uses a futures market to lock in a future price for delivery of their commodity. This helps in planning and reduces risk and uncertainty. Likewise, buyers of the commodity can use futures market to reduce the

uncertainty of a future commodity price. However, investors can also invest in futures contracts for speculative reasons alone, with no intention, and indeed no capacity, to take delivery. In doing so, they provide for greater market liquidity and depth, and also use all available market, climate, supply, and demand information in determining the value of contracts to deliver commodities on a given date. Consideration of all available information contributes to market efficiency and hence assists commodity buyers and sellers alike in reducing uncertainty. As a contract future date nears, the spot price and the future price of the contract narrows. A speculating investor who still holds the right to purchase the commodity on a given date typically will attempt to sell this contract before the date arrives.

First Stage Financing

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First stage financing or otherwise known as seed financing occurs when the venture has launched and attained initial momentum, thereby increasing company sales. At this stage the company is in its infancy stage and it commences its manufacturing and selling process by launching its product in the market. The venture capitalists appear at this stage by showing interest in the company. By this time, the management team and the officers are in place along with the line employees and other marketing/sales staff. The funding from this stage is used to boost sales in an attempt to reach the company's breakeven point, and create an elaborate system of distribution. During this stage, attempts are made by the firm to reduce its variable costs, increase production, and reduce its breakeven point.

First Time Fund

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A first time fund is the first fund that a private equity firm ever raises since its foundation. Usually, the firm is a spin-off, where managers of established funds—either of different firms or of the same firm—create their own new firm. Sometimes the firm is made up of managers who have never raised a fund before. In this case, the managers do not have a track record; therefore, raising the first time fund requires more efforts for them than for more established fund managers. Even for managers with a proven track record from their previous firms, raising the first time fund may be more difficult than follow-up funds, as in most cases they have never worked together as a team before. Thus, investments in first time funds are ranked as more risky. Furthermore, the importance of reputation in raising capital might induce young fund managers to take actions that are not in line with the limited partner's interests. Young venture capital firms might, for example, have incentives to take companies public earlier and more underpriced than more established firms, to establish a track record and signal quality to potential investors. This behavior is known as "grandstanding" (Gompers, 1996).

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Five Against Note Spread (FAN Spread)

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A five against note spread (FAN spread) is a futures operation, specifically, on 5-year Treasury Notes (T-Notes) and 10-year Treasury Bonds (T-Bonds). It consists of a spread operation that involves taking offsetting positions, that is, the simultaneous buying of one future contract against the sale of another future contract, either in the same or in a related market, with the aim of profiting from the price difference (Schwager, 2001). This precise operation consists in buying/selling a future contract on a 5-year T-Note and at the same time selling/buying a futures contract on a 10-year T-Bond. In this way, the investors can take advantage of the fluctuations of the interest rate and at same time try to reduce the risk of the futures market, which is typically high. The futures market is risky because it is characterized by the use of leverage allowing investors to have large margins. However, this leverage can be very dangerous if the signals for the market movements are misunderstood. One of the most common ways to take advantage of this leverage and reduce the risk is to use spreads (take two offsetting positions in the market). It should, however, be remembered that this type of operation does not always eliminate risk, and can concurrently limit the gain in the same way that it reduces the risk.

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Fixed Income Arbitrage

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Fixed income arbitrage is a certain type of a hedge fund strategy. In general, three different kinds of hedge fund strategies are distinguished: market neutral strategies, event driven strategies, and opportunistic strategies. Fixed income arbitrage belongs to the group of market neutral strategies, as is the case with convertible arbitrage strategies and equity market neutral strategies.

Market neutral strategies aim at exploiting pricing inefficiencies in capital markets without incurring systematic, that is, nondiversifiable, risk. Nevertheless, gains are not riskless as suggested by the term "arbitrage," but investors hope to be more than adequately compensated for the risk taken. Fixed income arbitrage strategies are designed to exploit relative mispricing in fixed income financing instruments as implied by inconsistencies of the term structure of interest rates, observed credit spreads, and/or liquidity spreads (Wong and High, 1993).

According to Duarte et al. (2005), five of the most widely used fixed income strategies are swap spread arbitrage, yield curve arbitrage, mortgage arbitrage, volatility arbitrage, and capital structure arbitrage (Fabozzi, 1997). Swap spread arbitrage combines entering a par swap with a fixed coupon rate against paying the floating LIBOR rate while at the same time shorting a par Treasury bond with the same maturity as the swap and investing the proceeds at the repo rate. Yield curve arbitrage is characterized by taking long and short positions for different maturities along the term structure. A mortgage backed security arbitrage emerges by buying mortgage backed securities pass-throughs, that is, mortgage backed securities that pass all (remaining) cash flows of a pool of mortgages through to the investors, and hedging their interest exposure with swaps. Fixed income volatility arbitrage attempts to make use of the difference between the implied volatility of financial instruments and the subsequently realized volatility by selling options and delta hedging the exposure of the underlying asset. Capital structure arbitrage (also called credit arbitrage) tries to exploit mispricing between a company's debt and its other financial instruments. In 2004, about 7% of the total value of hedge fund investments were managed according to fixed income arbitrage strategies (see Garbaravicius and Dierick, 2005). The most important hedge funds strategies are long/short equity strategies, an example of opportunistic investment strategies of hedge funds (32% market share in 2004), and event driven strategies (19% market share in 2004). According to Figure 1, fixed income arbitrage strategies lead to mean–variance return combinations that may be interesting for investors with rather high risk aversion. Although in Figure 1 the mean–variance profile of fixed income arbitrage is dominated by that which is achievable by equity market neutral strategies, fixed income arbitrage strategies may be an important component of an overall portfolio of hedge funds for an investor because of diversification effects.

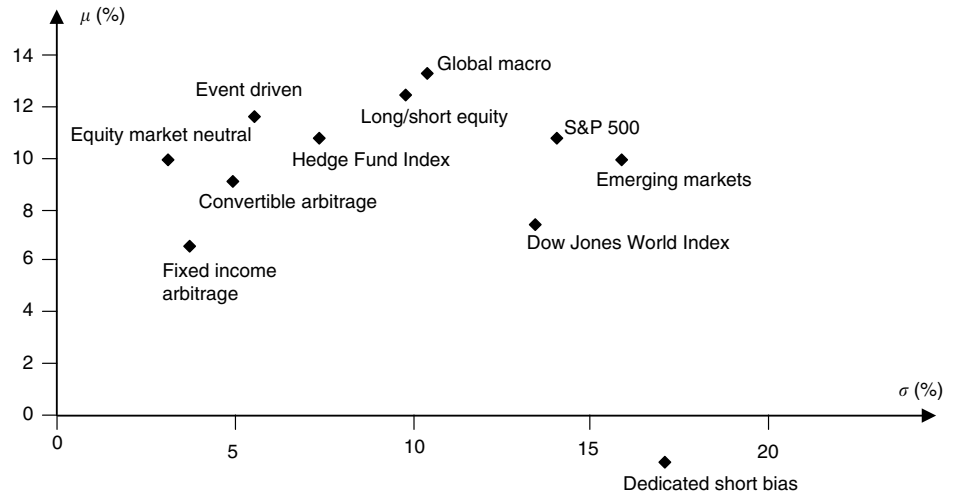

FIGURE 1
Mean–variance profiles of various hedge fund strategies and stock indexes. (From http://www.hedgeindex.com, May 2007.)

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Flipping

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Flipping is a term, mainly used in the United States, referring to the practice of purchasing an asset and immediately reselling (flipping) it for profit. Aggarwal (2003) states that flipping applies when shares are sold in the immediate aftermarket by investors who receive an initial allocation at the offer price and does not include purchases in the aftermarket. Flipping is the simplest method to make money through an IPO (by purchase of the new shares directly from the underwriter and then selling them immediately on the open market). Particularly, flipping involves reselling of a hot IPO stock in the first few days (or day) of trading to make a quick profit. This task is not a simple one and difficult to perform, and investors are highly dissuaded by underwriters. The logic is that underwriters prefer that long-term investors keep their stocks. There does not exist any laws that preclude flipping, but underwriters may blacklist "bad" investors from future offerings.

Fishe (2001) indicates that stock flippers are a massive problem for underwriters. They depress the market by immediately reselling their shares, creating a confusing environment for the remaining long-term oriented investors. Underwriters' main characteristic is to aggressively attempt to discourage flippers by various penalty schemes, such as threatened exclusion from future hot offerings. Consequently they should favor a lower offer price and overselling of the issue, which may lead the underwriter to assume a short position of the issue. The short position should be covered ideally with aftermarket purchases. Through an estimation of the total demand and flipping, underwriters select an optimal offer price that produces a cold, weak, or hot IPO.

Krigman et al. (1999) empirically measure flipping. The authors report that flipping is responsible for 45% of trading volume on the first day of trading for cold IPOs (this is due to the decreased trading volume in weak IPOs and is a result of frequent flipping) and 22% for hot IPOs. Recent indications favor the mainstream notion that institutions are intelligent investors and therefore flip a great deal more of the cold IPOs during the first few days, whereas the main investment bank provides price support.

Welch and Ritter (2002) state that penalty bids are rarely formed and "flipping may even be encouraged in order to keep market demand from pushing to unsustainable levels." The authors also argue that in instances of elevated levels of unnecessary flipping, the lead underwriter collects the commission paid to syndicate members for selling shares. Each syndicate obtains a selling concession based on the number of shares it issues. In the event that clients of a syndicate decide to flip their shares, the

selling concession on those shares is credited back to the lead underwriter.

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Float

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Float refers to the outstanding shares held by outsiders, usually reported as a percent of the total shares outstanding. A corporation (usually the board of directors) will authorize a certain number of shares. This authorization permits the company to issue shares, but most companies issue fewer than the total number of authorized shares.

From time to time, the company will sell some of the authorized shares. The company might sell shares by registering an offering, and then selling through an initial or secondary offering. The company may also issue authorized shares as private equity, sell shares through employee stock purchase plans and employee stock option plans, or issue shares on exercise of convertible bonds or preferred stock options. Some companies sell shares to existing shareholders through dividend reinvestment plans (DRIPs).

Many companies buy their shares. A company may buy registered shares in the open market or from holders to support the value of their shares or to buy shares to distribute through employee stock option plans. A company may reacquire restricted shares if an employee leaves the company before the full vesting date.

Shares issued by a company increase the number of shares outstanding. The company can retire the shares reacquired but, by convention, these shares are held by the company as treasury stock. In either case, the number of shares outstanding decreases by the number of shares acquired.

Employees, family members, managers, and members of the board of directors often hold significant positions in a company's stock. For a variety of reasons, these owners may be motivated differently than other shareholders. Employees, managers, and board members are more likely to vote as directed by the management. Sometimes, these stakeholders have an interest in preserving the status quo (including their jobs), rather than maximizing the shareholder's welfare. Family members and other large holders may have controlling positions that are more valuable because of the control, and so may be less likely to sell their shares at a particular price. Also, this group may have large deferred capital gains that discourage them from selling.

The percent of shares not held by insiders provides a rough measure of the amount of control held by insiders. It also provides a measure of the chance that a hostile company could force a takeover.

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Floor Broker

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Floor broker is an investment professional whose firm is a member of an exchange, typically a stock exchange, and who helps clients buy and sell securities on the floor of that exchange. Orders are transmitted to floor brokers via the firms they work for or through other registered representatives. These brokers could also be independent brokers, where they work for themselves and accept orders from any firm wishing to employ their services. In exchange for the services they provide, floor brokers receive commissions for executing transactions.

With the growth in the over-the-counter (OTC) markets and electronic trading in general, floor brokers will become less necessary in future, and the services they once provided will be carried out electronically. Floor brokers have also been called two-dollar brokers, as the compensation at one time for executing trades was $2 per trade.

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Floor Trader

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Floor traders are investment professionals who work at securities exchanges and attempt to profit, for their own account, by making numerous trades throughout the day. The process of making a small profit on hundreds of trades per day is called scalping. Floor traders are generally independent traders, who work for themselves, not an investment banking firm. Traders of this type are required to add liquidity to the markets in which they trade and need to make 75% or more of their trades in the opposite direction that a particular stock is trading. For example, if a stock has been moving up throughout a given trading day, with investors bullish on this stock, the floor trader must provide liquidity by selling shares of this particular stock. They can sell shares from their own account or attempt to find investors willing to sell shares of the stock in question. Floor traders are also called competitive traders, registered traders, and registered competitive traders.

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Follow-on Funding

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Venture capital companies typically finance firms throughout several stages, the first stage being followed by one or more follow-on funding rounds (i.e., staging). During the development of the firm, the venture capital investor learns more about the company and uses this information during the investment process. The stages typically correspond to important milestones in the life of the company (e.g., the development of a prototype, the first production, etc.). The capital invested at each time period must be adequate to bring the firm to the next development stage. With follow-on funding, the venture capital investor can decide on the optimal investment sum for the next stage or—in case of an inappropriate development—cut off the project from new financing.

Follow-on funding may mitigate the moral hazard behavior of the entrepreneurs, as it gives them incentives to work hard to achieve the goals and thus, obtain the next financing tranche. However, follow-on funding may create other problems, such as short-termism by the companies.

The number of follow-on funding rounds and the money obtained per round depend not only on firm characteristics, such as the development stage, asset tangibility, R&D intensity, but also on external conditions in the venture capital industry (Gompers, 1995).

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Forward Contracts

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A forward contract is a contract between a buyer (long position) and a seller (short position) in which the buyer agrees to buy and the seller agrees to sell a specific quantity of a security or commodity (known as the underlying asset) at the price specified in the contract. Agents must define a notional value to arrange the payment to make or to receive, but no capital payment is due to the counterpart. The underlying assets can be an interest rate, an exchange rate, a bond, a stock, an index, or a commodity. Because the forward contract is privately executed between the two entities, it is considered as an over-the-counter contract. In a forward agreement (Figure 1) (i) the long position payoff at maturity is $S(T) - K$, where $S(T)$ is the underlying asset price at maturity; and (ii) the short position payoff at maturity is $K - S(T)$.

During its life, the forward contract assumes the value as follows:

For a long position

$$f = (F_0 - K)\mathrm{e}^{-rT}$$

For a short position

$$f = (K - F_0)\mathrm{e}^{-rT}$$

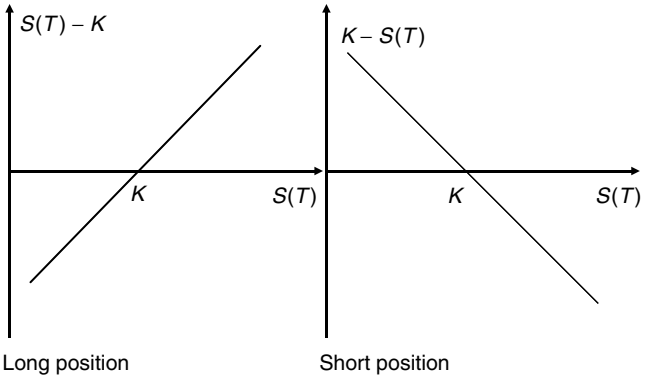

FIGURE 1
Forward agreement payoff.

where K is the price at maturity, F_0 is the actual forward price (i.e., the price of a forward is exactly the same as of the initial forward but traded at the valuation date), r is the continuously compounded rate, and T is the final date of the contract.

Some of the most important characteristics of the contract are as follows:

- High flexibility, in terms of underlying asset, size, and delivery date
- Counterpart risk
- Gain/loss completely computed at maturity
- Low secondary liquidity

Agents can decide to operate in the forward market with the following three purposes:

- Speculation, when positions depend on price expectations, with the risk to misinterpret the market dynamics
- Hedge, when the evolution of the forward price protects from unexpected price movements of cash positions held in portfolio
- Arbitrage, when it is possible to match two positions obtaining a gain for a price spread (assuming that the nonarbitrage condition holds, this opportunity fails)

Allaz and Vila (1993) put forward the reason of the existence of forward contracts even in a world without uncertainty. Many studies show the weakness of forward contracts to predict spot rates and prices. In case of interest rates, Fama (1976, 1984) demonstrates that forward rates fail to forecast since they do not incorporate the term premium. Buser et al. (1996) show that adjusting for the premium, forwards are reliable predictors of future spot rates.

Forward contracts are frequently used to implement hedge fund strategies, which trade derivatives, take short positions, or gain from arbitrages. In particular, forwards are frequently used by global asset allocator (or macro) funds managers, who match long positions in undervalued investments and short forward positions in overestimated assets.

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Forward Market

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On the forward market, delivery is at a future point in time rather than spot. Nevertheless, prices are fixed at the initiation of the contract. Trading takes place over-the-counter (OTC). This means that contracts are traded directly between counterparties (e.g., banks and their customers) and not on an exchange. Forward contracts enable companies to hedge their exposure, for example, to exchange rate movements. Consider for instance a U.S. company that runs a business in Germany. The U.S. company expects to earn €10 million in 6 months. This corresponds to substantial exchange rate risk. If the euro depreciates by say 0.1 dollar per euro, then the profit decreases by $1 million. In order to hedge this exposure the company may enter a forward contract in which it sells €10 million in 6 months to its bank. Since the price of the euro in terms of dollar is fixed today, the U.S. company knows exactly how many dollars will be obtained for delivering euros. Alternatively, the company may also trade futures contracts. In contrast to forward contracts, futures prices are determined on an exchange. One may argue that this leads to better pricing. Nevertheless, one must not forget that (at least) the FX forward market is very liquid and pricing can therefore be considered as competitive. Furthermore, futures contracts may require substantial intermediate payments due to the mark to market practice, which must be financed with cash. Furthermore, contract specifications like the settlement date can be tailored to the specific needs of the counterparties as opposed to the standardized contracts on future exchanges.

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Forward Volatility Agreement

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A forward volatility agreement (FVA) is a forward contract on the realized or implied volatility of the returns on a prespecified financial asset. Such assets can be common stock, a stock or commodity index, or a foreign currency or a bond interest rate. The contract settlement is analogous to that of other forward agreements. It is based on the difference between the contractual volatility level, which is determined at the trade date, and the volatility level given at the settlement date in the future. The principal use of FVAs is the trading and hedging of changes in the return volatility of the underlying asset.

Volatility is an essential input parameter in option pricing. While the classical

Black/Scholes and Merton option-pricing model (i.e., arbitrage pricing) is based (among other assumptions) on a constant return volatility of the underlying, option pricing under stochastic volatility faces market incompleteness when volatility risk cannot be traded. One may then assume for simplicity either that volatility risk is unpriced (as for example in the seminal article by Hull and White, 1989) or that a known risk premium is given, and then derive option prices under stochastic volatility. The market incompleteness given by the lack of volatility as a tradable underlying demanded financial innovation and fostered the development of new volatility instruments.

Common types of FVAs include forward volatility contracts (commonly also referred to as volatility swaps) as well as volatility futures. Tradable volatility instruments allow the hedging of volatility risk and thereby give way to a derivation of preference-free option prices under stochastic volatility. An inaccurate anticipation of lifetime volatility may cause large hedge errors. This is particularly the case during periods of market stress. Hence, with the enormous development in derivative markets during recent decades, the need for instruments, which allow the trading of volatility in financial markets, has become even more pronounced. FVAs can improve trading strategies in at least two fields of application:

- *Hedging*: While it is relatively easy to hedge the risk of a derivative's position against market moves in the underlying (i.e., delta hedging), hedging against changes in volatility (so-called vega risk) is rather difficult given that there is no liquid market for volatility.
- *Speculation*: Market participants who want to take bets on future volatility may use options positions such as straddles. However, these do not form pure bets on volatility only but contain other risks including delta risk.

The most common form to engage in an FVA is by trading an over-the-counter (OTC) forward volatility contract. These contracts are traded directly between financial institutions and corporations, which both bare full counterparty risk. In a standard forward volatility contract, the payoff at expiration is given by the difference between the realized or implied volatility, depending on the contract specification, and on the prespecified volatility level referred to as the strike of the forward contract. Most contracts are realized volatility contracts while contracts on implied volatility are also traded. In the case of realized volatility, it is essential to define the data and methodology used for deriving an estimate of the volatility during a given historical time period. In the case of a contract on implied volatility, the underlying is commonly given by a volatility index, such as the VIX (Chicago Board of Options Exchange [CBOE] implied volatility index based on S&P 500 index options), the NVX (CBOE implied volatility based on NSADAQ 100 index options), or the VDAX (EUREX implied volatility index based on DAX index options).

Surprisingly, the trading of volatility derivatives on organized exchanges has not been established since recently. A first attempt to introduce contracts on volatility was by Deutsche Boerse AG, Germany, in 1997. However, the VOLAX volatility future could not attract sufficient liquidity and therefore was discontinued in 1998. One reason for this may have been that futures

arbitrage required trading of complex option portfolios since the underlying volatility index VDAX itself is not tradable. A second product started on March 26, 2004, when the CBOE launched trading in a contract on volatility, namely the "CBOE S&P 500 volatility index (VIX) futures" or "VX futures" in short. The contract is based on the VIX volatility index as an underlying; the underlying value is ten times the VIX index value and cash settlement follows directly from the VIX index level at expiration date. Electronic trading takes place at the CBOE futures exchange.

Studies on volatility derivatives include Carr and Madan (1998) and Grünbichler and Longstaff (1996). Benhamou (2000), Brenner and Galai (1989), Knauf (2003), Locarek-Junge and Roth (1998) and Whaley (1993, 1998) discuss available instruments and strategies.

A growing activity in FVAs promises improved risk allocation among investors and an increased level of option market efficiency. In a summary of the above, forward volatility agreements may be considered as a recent case in financial innovation.

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Free on Board (FOB)

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Free on board (FOB) is one of the so-called International Commercial Terms (Incoterms). The Incoterms are specified contractual terms in foreign trade and were first published by the International Chamber of Commerce in Paris in 1936. The Incoterms are clauses that can be included in foreign trade contracts to specify which part of transportation cost the seller of the goods has to pay and which part of transportation risk he bears. The Incoterms do not regulate when the legal ownership of the goods pass over from the vendor to the acquirer. FOB means that the vendor has to bear the transportation cost and has to take into account for the transportation risk until the good passes the ship's rail. Current guidelines for Incoterms are available from the International Chamber of Commerce (2000a, 2000b).

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Fundamental Analysis

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Within the context of the fundamental analysis, the price of a stock is determined by taking into consideration two fundamental elements of valuation: expected return and risk. To form return and risk expectations, a thorough analysis should be carried out at (i) the economy level, (ii) the industry level, and (iii) the company level.

At the end of the analysis, the intrinsic value of a stock is determined and compared with the current market price. The underlying assumption is that the market price approaches the intrinsic value in the future. The comparison of the intrinsic value and the market price is vitally important in deciding whether the stock is mispriced. Finding out that the stock is overvalued (requires a sell decision) or undervalued (requires a buy decision) is in itself not sufficient to make such a trading profitable. The profit is realized only if that particular stock is found and valued in the same way by most of the other investors who will make similar buy/sell decisions. The overall effect of these similar decisions is to change the demand for the stock that, in turn, changes its market price in the future.

The major steps in the fundamental analysis are as follows:

1. Transformation of the results obtained from the analysis of the selected macroeconomic variables such as the money supply, government budget deficit (surplus), the economy's potential output capacity, and other national/international events into tools for prediction of the likely changes in the future performance of the economy.
2. Determination of the sensitivity of each industry to the predicted changes in the economic activity. It should be noted that the usefulness of the industry analysis in investment decisions depends on the quality and amount of information on industries, the length of time devoted to the analysis, and skill/expertise in (a) understanding and interpreting the information contained in the financial, economic, and on all other types of relevant data; (b) building a model to value industries, interpreting the results of the evaluation; and (c) using them in investment decisions.
3. Evaluation of the behavior of each company in each of the selected industries and calculation of the intrinsic value of each company's stock. It should be noted that anticipated changes in the economy, or in specific terms, an anticipated expansion (or contradiction) in economic activities would differently affect the growth rates of industries. For example, not all companies in an expanding (or contracting) industry are expected to grow (contract) evenly. There will be differences among the growth rates of companies operating in an industry. Therefore, the primary

aim of the company analysis is to select companies whose stocks appear to be overvalued or undervalued. The steps of the company analysis are stated as follows:

i. To analyze and assess the qualitative characteristics of companies to gain an insight into current and future earnings strengths. Some major qualitative characteristics are (a) *quality of management*: in the determination of the future value of the company, the quality of decisions made at the present by the management plays a crucial role; (b) *competitive position*: company's ability to compete successfully with its competitors is determined collectively by company size, product diversification, research and development outlay, the nature of protection on the new products, and know-how; and (c) *quality of earnings*: quality of earnings is determined based on the company's activities that generate them. In other words, earnings generated by the extraordinary activities are not sustainable and not contributing to the quality of earnings, whereas earnings generated by ordinary activities are continuous and increase the quality of earnings (Schipper and Vincent, 2003; Cornell and Landsman, 2003; Lev, 1989).
ii. To analyze and assess the financial performance of companies in order to provide or support the conclusion reached by analyzing qualitative variables. Financial statements are the primary source of information that an individual investor relies on to support the judgment on the company after analyzing its qualitative factors (Lev and Thiagarajan, 1993).
iii. To determine the intrinsic value of the stocks of the companies under consideration. Conventional valuation techniques are employed to calculate the intrinsic value (Damodaran, 2002): (a) *the dividend valuation model*, which estimates the intrinsic value of a stock by calculating the present value of the future dividends expected. Constant growth rate, perpetual growth rate, sustainable growth rate, and two-stage dividend growth rate models are formulated based on different assumptions of growth rates. Thus, the model is sensitive to the choice of growth rate and discount rate, which are difficult to estimate. A major shortcoming of the dividend valuation model is that it could not be used to value stocks of nondividend paying companies. (b) *The price multiples* can be used for all companies regardless of the dividend payment policy. Most widely used price multiple is the price/earnings ratio; however, price to cash flow, price to sales, or price to book value ratios are also employed in the valuation process.

In short, the tasks of an individual investor who wishes to follow the valuation procedures of the fundamental approach are as follows:

1. Estimation of earnings per share (EPS) for the next period.
2. Estimation of the investor's required rate of return (r), which is used as a

discount rate in the dividend valuation model. It reflects the risk of the company stock.
3. Estimation of the expected growth rate (g) of the earnings or the dividend stream.
4. Estimation of the payout (or retention) ratio.

It should, strongly, be emphasized that the above-mentioned parameters are induced to change by the changes at the economy, industry, and company levels. These changes introduce immense difficulties in the estimations of EPS, r, g, and the payout (or retention) ratio.

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Fundraising

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Financing entrepreneurial ventures is inextricably linked to raising the funds needed to carry out investments. Fundraising is a vital activity, regardless of the legal classification of the deal, the structure of the players involved, or the characteristics of the companies or projects that will subsequently be chosen. Despite its importance, this issue has never elicited much interest in terms of academic research. However, some results from recent empirical studies can be cited.

The activity, or better still, the ability to raise funds is strongly correlated with the track record of the player in question from the previous year. Specifically, historic returns on transactions undertaken in the past and the amount of resources made available by the market are particularly indicative variables.

The size of private equity investors is directly proportional to their capacity for fundraising, and this capacity is a function of certain factors: market conditions, the structure of venture capital investors, the type of investment in which resources are channeled, the financial instruments that are held by the private equity player with respect to the deal, the level of development, and the sector in which the companies do business.

Fundraising performance does not depend solely on expected and historic returns, or on the "joy of giving" of resource providers. Instead it is also linked to factors that are not purely financial, such as reputation building or the future ability to carry out transactions. In this context, the importance of contractual formulae and clauses emerges within the relationships between suppliers of financial resources and investors in venture capital: the structure of the agreement between the parties can impact the success of the fundraising phase, and consequently, the outcome of later investment policies.

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Funds of Funds

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Funds of hedge funds (FoHF) invest in existing funds or managed accounts run by different managers. The first worldwide FoHF, leveraged capital holdings, was set up in 1969 by Georges Coulon Karlweis for the Banque Privée Edmond de Rothschild. The strategy of FoHFs is to decrease the volatility of investing in a single hedge fund by diversifying into a portfolio of funds and managers.

Funds of hedge funds are considered less risky than alternative investment strategies. For example, FoHF managers can freely select the portfolio strategies they use. FoHF managers are therefore able to allocate their funds to a single strategy (single-strategy funds of hedge funds) or to various strategies (multistrategy funds of hedge funds).

Worldwide, the number of FoHFs has increased dramatically over the last decade. In 1990, according to hedge fund research (HFR), there were about 80 FoHFs; by 2000, that number had increased to 538. By the end of 2006, the amount had more than quadrupled to 2221, primarily due to high demand from institutional investors who prefer FoHFs for their first hedge fund allocation. About 70% of FoHFs use leverage, but mainly to finance backup solutions, not for investment purposes. Figure 1 shows the typical investment process of a FoHF.

We can classify FoHFs according to their management concepts into the following industry typical classes:

- Index concept
- Qualitative concept
- Quantitative concept

Funds following the *index concept* invest in up to 100 individual hedge funds, with the aim of tracking the risk/return profile of the entire hedge fund field. Managers using this concept believe their selection skills will lead to long-term outperformance and minimize blow-up risk. The index approach

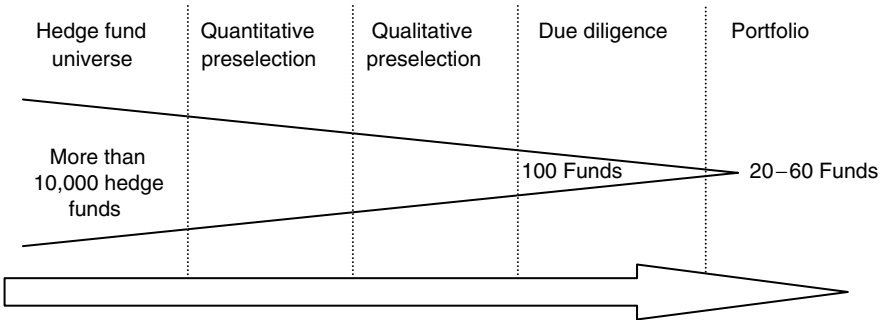

FIGURE 1
FoHF investment process.

is characterized by simplicity, clear investment rules, and significant diversification to safeguard investors from managerial risks.

Funds following the *quantitative concept*, hold up to 50 funds, and attempt to quantify their weight and style allocations based on models. Many statistically uncorrelated hedge funds may thus be combined in one portfolio. Quantitative managers try to generate additional value through selection and active optimization of different hedge fund style allocations.

The *qualitative concept* is characterized by limiting the portfolio to a maximum of 20 hedge funds selected through thorough due diligence and rigid qualitative monitoring of portfolio positions. Managers following this approach do not see any additional value in past hedge fund performance. They aim to generate value by sound diversification of different performance strategies. Due diligence and monitoring, however, are large expenses for these managers.

Lhabitant and Learned (2003) note that most funds of funds hold between 15 and 40 underlying hedge funds, but a portfolio consisting of 5–10 would provide most of the diversification benefits. Lhabitant (2006) also shows that as the number of hedge funds increases, the beta of the portfolio also increases. Kat (2004) shows that FoHFs provide skewness protection while offering diversification through a basket of hedge funds.

Subscription and exit solutions are possible in the hedge fund universe on at least a monthly basis. Fothergill and Coke (2001) have shown that most FoHFs do not charge an entry fee. However, if third parties such as brokers or banks are involved in the sale of shares, there is usually a sales fee and a yearly performance fee.

Hedge fund lock-up periods, during which investors cannot take money out of the fund, must also be considered by investors. According to an AIMA study, 70% of FoHFs require a lock-up period of at least 6 months. The other 30% usually have an individual lock-up period. The minimum investment in a FoHF ranges from U.S. $50,000 to $250,000.

One of the major disadvantages of investing in FoHFs is the additional fee level compared to an allocation in single hedge funds. Typically, FoHFs charge a combination fee, consisting of either a 1.5% management fee with no performance fee, or a 1.0% management fee combined with a 10% performance fee. We assume that the pressure on FoHF fees will increase in the coming years, and we expect they will ultimately decrease to a management fee of between 0.70 and 1.00%, with no performance fee.

The literature thus far has found mixed results regarding FoHF performance versus individual hedge fund performance. Brown et al. (2004), for example, find that individual hedge funds dominate funds of funds on an after-fee return basis or a Sharpe ratio basis. Based on an empirical analysis of 907 FoHFs, Capocci and Hübner (2006), however, find empirical evidence of performance persistence, and show that the Sharpe ratio is the most suitable measure. According to Fung and Hsieh (2000), FoHF performance does not depend on various biases (survivorship bias, self-selection bias, instant history bias) because (1) they also include hedge funds, which are not found in any database, (2) they feature data on hedge funds that have ceased to operate, and (3) their historical track records do not include the performance of any new funds they may have invested in.

The market for FoHF can be divided into small (up to U.S. $500 million

in assets under management [AUM]), medium ($501 million to $1 billion AUM), and large (over $1 billion AUM). The large category only comprises about 10% of all FoHFs.

Risk-averse investors tend to invest in large funds of funds with a high degree of diversification. Investors aiming for high returns or an outperformance of strategy indices may opt for smaller, specialized funds of hedge funds.

The large fund of funds model has the following advantages:

1. Investment resources to select and analyze managers from a large database
2. The potential to diversify by selecting various managers
3. A better negotiation position for individual hedge fund fees
4. The capital to equip new managers with seed money
5. Decreasing fixed administration costs
6. Lower entrepreneurial risk for investors

The advantages of FoHFs generally are their established market reputation and long track record based on long-term hedge fund investment. However, there are several disadvantages that should not be ignored, such as:

1. Difficulty in optimally allocating large sums of capital
2. Potentially suboptimal manager allocation to guarantee future investment capacity
3. A tendency to overdiversify
4. Difficulty in actively allocating within specific strategies
5. A practical inability to invest in *niche strategies* or very tight strategies (*quasi-closed*)

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Fungibility

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In general terms fungibility refers to the capacity that an asset or good has to be replaced by another with equivalent or similar characteristics. In the case of goods or products, a good is usually considered fungible if it is not possible to distinguish between one unit of a particular commodity from another unit of the same commodity. For example, the commodities of electricity, petroleum, or metals are normally considered to be highly fungible;

similarly, fungibility can also be attributed to money. In the organized commodity futures markets, the goods that serve as underlying assets have to be homogeneous or fungible with one another (Kolb and Overdahl, 2007). To ensure this, minimum accepted standards are established, which the commodity must satisfy to be accepted as an underlying asset (this is known as basis grade). In addition, the futures (options) that are negotiated in a market and that have the same characteristics (the same underlying asset, the same delivery period or exercise date, the same size, etc.) can be considered as homogeneous or fungible with one another (The Options Institute, 1999). This makes it possible to eliminate the direct link between the buyer and the seller, which facilitates negotiation, as both types of investors can close out their positions before the delivery period (or exercise date) entering into an opposite trade to the original one.

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Futures

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A future or futures contract is a standardized agreement to buy or to sell an asset (the underlying) at a certain future time (settlement date) for a prearranged price (the future price). One of the two parties of a futures contract holds the so-called long position, that is, to buy the underlying. The other position is called the short position. A futures contract itself is traded and listed on a futures exchange. This contrasts it with a forward contract that is not standardized and is done on an over-the-counter basis. Futures contracts are always binding for both parties of the contract. This differentiates futures from options contracts where only one party, the option writer, is obliged to fulfill the contract, while the other party, the option holder, has the option but not the obligation to buy or sell.

There are two important classes of underlyings that can be identified: commodities and financial assets. Typical commodities that underlie futures contracts are pork, live cattle, sugar, wool, lumber, copper, aluminum, wool, and tin. Typical financial assets include stock indices, currencies, and Treasury bonds. Futures contracts are normally traded on special futures markets. The largest markets for futures are the Chicago Board of Trade (CBOT), the Chicago Mercantile Exchange (CME), the London International Financial Futures Exchange (LIFFE), or the Eurex in Frankfurt.

The value of a futures contract can be explained by the relationship between futures and spot prices. This relationship is called cost of carry because the owner of a short position has always the opportunity to buy the underlying asset immediately after the closing of the futures contract by paying the spot price and carrying the asset until the settlement date. The cost of carry consists not only of carrying charges but also of financing costs. Financial assets do not only have cost of carry but they also deliver cash inflows deriving from interest or dividends. If the futures price is larger

than the spot price plus the cost of carry, arbitrage opportunities arise by getting into a short position and by immediately buying the underlying on the spot market. If the futures price is smaller than the spot price, selling the underlying and getting a long position in the futures market would also deliver an arbitrage opportunity.

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Futures Commission Merchant

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A futures commission merchant (FCM) is a legal entity or an individual that offers futures market brokerage services. An FCM has to be a member of the National Futures Association (NFA), which is responsible for registration and general supervision, and it must be registered with the Commodity Futures Trading Commission (CFTC) to whose regulation it is subject. Furthermore, FCMs are subject to the regulation of the respective commodity exchanges. To enter into a futures contract, each party that is not an exchange member itself must utilize directly or indirectly an FCM's brokerage service. Exchange members who are not clearing members themselves are required to trade through an FCM that is a clearing member. For its services the FCM charges its customers brokerage and other fees.

The FCM assumes the counterparty risk for both long and short futures contract positions. To mitigate this risk, to guarantee market integrity, and to protect other market participants the customers, except for exchange members, typically have to deposit a margin with the FCM. Minimum and additional margin requirements are set by the exchange and by the FCM, respectively. The margin account is opened with an initial margin payment and is used to ensure daily (or more frequent) settlement of the gains and losses of the contract position. The FCM may make margin calls to rebalance the account and typically benefits from the interest-free use of the margin deposits. To mitigate the risk of its own default the FCM must deposit a margin with the clearing organization.

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Futures Contract

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Futures contracts, like options and swap, are an example of a financial instrument known as derivatives. In other words,

futures contracts derive their value from an underlying asset such as stocks, currencies, an index such as the S&P500, Treasury-bill rate, etc. These contracts are standard contracts in terms of maturity date and also contract sizes. In a way, futures contracts replace forward contracts in organized markets—that is, they do not rely on chance matching—with standardized contracts. The major traders in the futures markets are hedgers and speculators. While hedgers try to eliminate or lower the risk they may face from price changes in the future, speculators' aims to profit from price changes based on their expectations.

Trading for a futures contract takes place on an organized futures market (e.g., Chicago Mercantile Exchange [CME]), to buy or sell an underlying asset/instrument at a specified delivery or maturity date for an agreed-upon price which will be paid at the delivery date. The agreed-upon price is called the future price. The trader taking the long position in the futures market promises to buy the asset/instrument at the delivery date, whereas the trader taking the short position promises to sell/deliver the asset/instrument at the delivery date.

In a futures contract, each trader has to establish a margin account. Usually, the amount required for margin or performance bond ranges from 5 to 15% of the contract value. Under marking to market, profits and losses go to traders' margin account at the end of the day. For example, assume you have a long position for euro that will mature in 76 days. One lot of euro contract will have 125,000 euros traded in CME, with an initial margin at $2025. Let us assume the future price is $0.7450 per euro. At the maturity date, if the price of euro is $0.7825—hence USD appreciates—the long position trader will earn a profit of $0.0375 per contract. In other words, total gain will be $0.0375 $\times$ 125,000 = $4,687.50. On the other hand, short position trader will lose exactly the same amount—long position trader's gain will be equivalent to short position trader's loss. Especially for financial futures, marking to market will minimize the credit/default risk for traders. For example, if the price of euro decreases to $0.7425 at the end of the day, there will be a loss of $312.50 for the long position trader. This amount will be taken from the margin account. As a result, the contract will be renewed with the new price, $0.7425, at the end of the day. If there is a profit next day, the gain will be deposited to the margin account. In addition, if the amount in the margin account falls below the maintenance margin, say $1500, there will be a margin call to the trader. The trader needs to deposit additional funds to the margin account. Hence, default risk will be minimized as a trader with a high risk, and an unprofitable position will be forced into default at an early stage because of small losses rather than huge losses built after a long time. Thus, marking-to-market is another difference between a forward contract and futures contract. With forward contract, a trader has to wait until the maturity date to realize any loss or gain, which leads the default risk to be higher.

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Futures Industry Association

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The Futures Industry Association was created in 1955 in New York as the Association of Commodity Exchange Firms (http//www.futuresindustry.org). It was initially created to offer a forum to talk about issues, work together with exchanges, represent the public client, find and develop methods to diminish costs, eradicate the misuse of credit, assist on educational efforts, and defend companies from fake warehouse receipts. The Futures Industry Association is the only association representative of all organizations that have an interest in the futures market. The Futures Industry Association is governed by a 34-member board of directors, which includes representatives from Futures Commission Merchant, money management firms, associate members, and two public directors.

Usually members or associates are typically futures commission merchants that are responsible for a large percentage of the client business that is carried out on U.S. futures exchanges. Associate members include numerous international exchanges, investment banks, law firms and accounting firms, introducing brokers, commodity trading advisors (CTAs), commodity pool operators as well as many other market users (http://www.watersinfo.com).

The Futures Industry Association is a source of volume statistical information. It collects volume and open interest data on all domestic and international futures, options on futures and stock indexes, index rates, and currency contracts traded on U.S. security exchanges.

The Futures Industry Association's board has various standing committees including those on derivative products, financial integrity, and international business. It provides a discussion for futures and options professionals in the industry from around the globe to partake information and concerns about the worldwide futures industry.

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G

Gain Standard Deviation

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The Gain Standard Deviation is a measure of risk that is basically similar to the standard deviation, except that this is a statistic, which considers the variability of the positive returns around their mean only (Lhabitant, 2006). For example, when determining this measure all periods/observations with negative outcomes are neglected and, thus, volatility is calculated solely on the basis of the gain periods. Correspondingly, when calculating the opposite volatility measure—the loss standard deviation, in an analogous way—only the loss outcomes are considered. The gain standard deviation, in essence, is a measure of the upside (ex-post or ex-ante) risk. The higher the gain standard deviation, the higher the variability of the (possible or observed) positive outcomes. Lower values can be interpreted as a rather uniform distribution of the positive outcomes.

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Gain-to-Loss Ratio

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The gain-to-loss ratio is the ratio of the expected gain divided by the expected loss in a certain measurement period. The term "gain" refers to the expected excess returns that are above the risk-free rate and the term "loss" is the negative of expected excess returns that are below the risk-free rate. The approach is intuitively appealing, inasmuch as gain conceptualizes a profit and a loss as its antonym. A gain-to-loss ratio greater than one means

the expected gain exceeds the expected loss. In this concept, expected gain and expected loss serve as an alternative to mean and variance, which are more commonly used in finance. In terms of a gain-to-loss ratio, this appears to be especially valuable when return distributions are not normally distributed. This is particularly the case in options markets, bond markets, insurance markets, and equity markets. For example, suppose an asset is selling for $100 and an investor assumes a 0.60 chance that the asset could appreciate to $140 within 1 year and a 0.40 chance that it could decline to $90. Given a risk-free rate of 5%, the expected gain is $0.60[(140/100) - 1.05] = 0.21$. The expected loss is $0.40[1.05 - (90/100)] = 0.06$. The gain-to-loss ratio is $0.21/0.06 = 3.50$. This compares favorably with the average S&P 500 long-term ratio which O'Connor and Rozeff (2002) estimate to be 3.0 for the period 1926–1997.

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Gate

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"Gate" is a term that refers to an investor's right to redeem shares from a Fund. A gate limits the amount of outstanding shares of a fund that can be redeemed at a given redemption date. In a circumstance where redemption request exceeds the given limit, redemptions are usually granted on a first-come, first-serve basis, where the remainder is pro rata distributed on the next given period. The gate will be stated in each fund's offering documents and varies from fund to fund. Typical gates range in the area of 15–25% of the fund's assets. Gates can be on a share class, feeder fund, or master fund level. The following is an example fund that has a 25% gate with the next available redemption date of 31st March. The fund receives redemption requests of 32% of the outstanding shares of the fund. The first 25% of investor's capital that was received to be redeemed will be payable according to the fund's redemption schedule. The remaining 7% will be held over until the next redemption date.

The purpose of a gate is to protect the remaining shareholders of the fund. The gate is usually set with accordance of a limit where the fund manager believes that redemptions past the limit will have adverse effects on the fund. As Anson (2006) notes, if the fund is fully invested at the time of redemption, the additional transaction costs that otherwise would not be incurred will be borne by all investors. Additionally, the less liquid assets the manager holds, the greater the costs associated with withdrawal. If a large redemption forced the fund to raise funds to meet the redemption, a fire sale might occur, where all the selling would drive down the price of the assets the fund holds and set off a material decline in the fund's net asset value.

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Gatekeeper

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Gatekeepers are intermediaries who pledge their reputation to protect investors, and thus to regulate the capital markets. These independent professionals, including outside accountants, auditors, underwriters, investment banks, rating agencies, securities analysts, stock exchanges, mutual funds, attorneys and lawyers, assess, verify and certify the corporate issuer's disclosures to prevent fraud. If they withhold their consent, approval, or rating, they can deny access to capital markets and block admission through the gate. Many financial scandals in the late 1990s and early 2000s have underlined the relative ineffectiveness of some gatekeepers. Despite improvements, such as Sarbanes Oxley Act of 2002, legal duties and legal liability faced by gatekeepers need reforms.

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General Partner Contribution/ Commitment

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A partnership requires at least two investors. In the simplest partnership all partners share the risk and reward of the investments equally. The partnership agreement may define how profits are allocated and may impact how small losses are allocated. However, in a simple (or "general") partnership, each partner is liable for the obligations of the partnership, even if this results in losses distributed differently from the terms of the partnership agreement (usually this is described as being generally liable). Typically, losses are allocated to partners according to rules set forth in the partnership agreement, but when losses exceed the paid-in capital each partner is liable for the entire amount of the partnership's liability. Partners with adequate wealth may be required to cover partnership obligations out of proportion to the investors' share of partnership interests if other partners are unable to assume partnership obligations.

A general-limited partnership (frequently called a limited partnership) has at least two types of partners. Limited partners make a contribution to the partnership, which they can lose if the partnership loses money. But the limited partners cannot be required to make additional contributions to the partnership or assume any additional liabilities of the partnership.

In contrast, a general partner can be required to make capital investments in a partnership to cover obligations of the partnership or assume liabilities of the partnership. Like the partners in a general partnership, all the general partners in a limited partnership are generally liable.

Frequently, general partners take steps to limit their general liability. Instead of an individual or a company investing directly in a partnership as a general partner, the investor creates a business to become the general partner. The investor funds a limited liability company like a corporation that becomes the general partner. Although the company acting as general partner is considered to be generally liable for the obligations of the partnership, the company can have limited capital and creditors of the partnership generally cannot require the owners of the corporation acting as general partner to make additional investments.

Investments in the business that acts as general partner may be the only capital available to creditors of the partnership. This capital can be in the form of cash capital investment, other assets contributed, loans, or a note. Suppose, for example, that an individual makes a $1 million investment in XYZ, LLC. XYZ, LLC becomes general partner in ABC, L.P. Although XYZ, LLC is generally liable for the obligations of ABC, L.P., creditors of the partnership cannot look through the corporate structure to the owner of XYZ, LLC.

If the investor makes a written agreement to let XYZ, LLC demand an additional $500,000, then XYZ LLC can be expected to lose up to $1.5 million with a $500,000 capital call if losses draw down capital.

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Generalized Treynor Ratio

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The generalized Treynor ratio (GTR) developed by Hübner (2005) is a performance measure for managed portfolios with directional strategies developed in the context of multi-index asset-pricing models. This ratio shares the same properties and interpretation as the original Treynor (1965) ratio, defined as the alpha divided by the portfolio beta, developed in the framework of the single-factor CAPM.

In the presence of a benchmark portfolio m, the GTR of a portfolio p simply writes as the alpha times the ratio of the required return on the benchmark divided by the required return on the portfolio:

$$\mathrm{GTR}_p = \alpha_p \frac{\bar{R}_m - \alpha_m}{\bar{R}_p - \alpha_p}$$

As for the original Treynor ratio, the GTR can be interpreted as the ratio of abnormal performance (the alpha) over the systematic risk exposure of the portfolio. Because it is leverage invariant, the GTR is intrinsically superior to the alpha, which can be manipulated by modifying the leverage of the portfolio.

TABLE 1

Spearman Rank Correlation Coefficients between Rankings

	Change in Benchmark	Change in Model
GTR	0.920	0.974
Alpha	0.799	0.924
Info. ratio	0.610	0.869

Source: Exhibit 4 and Exhibit 5 of Hübner (2007).

On the basis of a sample of style-based mutual funds, Hübner (2007) shows that rankings based on the GTR provide more reliable results than the use of alpha and the information (or appraisal) ratio. This means that with the GTR, the classification of funds is less sensitive to the choice of the asset-pricing model or the choice of benchmark than with the other two measures. The Spearman rank correlation coefficients between the rankings under alternative specifications are summarized in Table 1.

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German Entrepreneurial Index

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The German Entrepreneurial Index (GEX®) is an innovative style index that measures the performance of publicly quoted owner-dominated German companies. The index was introduced by the German stock exchange (*Deutsche Börse Group*) in 2005. For a firm to be listed in the GEX®, it has to fulfill five criteria that are audited quarterly by the Center of Entrepreneurial and Financial Studies (CEFS) at Technische Universität München: (1) it has to be quoted in the Prime Standard of the Frankfurt Stock Exchange; (2) its IPO or first quotation of its common stock must date back at most 10 years; (3) the cumulated share ownership of the GEX® relevant group of persons (active members of the executive board and their families, active members of the supervisory board and their families, former members of the executive and supervisory boards and their families) in the voting stock of a company amounts to at least 25%; (4) at most this cumulated share ownership should be 75% to ensure a minimum liquidity of the stock; and (5) all GEX® companies must have their headquarters in Germany.

The benchmark is a useful indicator of the exit possibilities of private equity investors. For the GEX®, as for all stock indices of *Deutsche Börse*, the weight of the individual stock in the index is determined by their market capitalization, with only the free-float share, that is, the share of freely tradable stocks counting. Furthermore, the weight of a single stock is limited to a maximum of 10%. As index formula for calculation time t, a quarterly chained Laspeyres formula is used:

$$\text{Index}_t = K_T \frac{\sum_{i=1}^{n} p_{it} q_{iT} ff_{iT} c_{it}}{\sum_{i=1}^{n} p_{i0} q_{i0}} \text{Basis}$$

where K_T is the index specific chaining factor from time T, T is the time of the previous

chaining, p_{it} (or p_{i0}) is the price of stock i at time t (or the final price of stock i on the trading day before the first trading inclusion in an index), q_{iT} (or q_{i0}) is the number of underlying stocks of company i at time T (or the number of stocks of company i on the trading day before the first trading inclusion in an index), ff_{iT} is the free-float factor of type i at time T, c_{it} are the present correction factors of company i at time t, n is the number of stocks in the index and on base 1000, which for the GEX® was set at July 7, 2004 (Achleitner et al., 2005).

The GEX® is calculated as a performance and as a price index. The former measures performance in terms of total return, that is, potential income from dividend and premium payments are reinvested in the index portfolio (operation blanche), whereas the latter calculates the true price changes, only taking into account corrections for income from stock purchase warrants and special payments. The technical GEX® regulations (e.g., regarding exactness of the calculations, adjustments, capital increases and reductions, readjustments of the nominal value, etc.) correspond to the regulations for the other indices of *Deutsche Börse* and are therefore not considered in detail here. The theoretical motivation of the GEX® is a positive influence of insider ownership on firm value documented for the German capital market by Kaserer and Moldenhauer (2007).

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Global Hedge Fund Index

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Hedge funds are more or less unregulated investment instruments that vastly differ in their management strategies. To create an index including all hedge funds is a challenging task. Nevertheless, global hedge fund indices try to represent the global universe of hedge fund investments across different strategies, see e.g. Hedge Fund Research Inc. (2007). There are indices representing only one particular strategy (e.g., convertible arbitrage). In contrast, a global hedge fund index consists of a combination of selected strategies. These strategies can, for example, be asset weighted. This weighting scheme automatically reacts to changes in the composition of the hedge fund industry because the different investment strategies are weighted according to the distribution of assets in the overall hedge fund universe. Such a dynamic weighting scheme would be an alternative to an equal-weighted strategies scheme. Another alternative weighting scheme equally weights each fund to avoid that only a small number of large funds have the most significant impact on the index. In contrast, usually by weighting the investment strategies according to the number of funds in each strategy, a global hedge fund index is constructed.

Then, the strategies included in a global hedge fund index can generally be classified into (a) relative value strategies, (b) event-driven strategies, and (c) opportunistic strategies.

RELATIVE VALUE STRATEGIES

Relative value strategies (or market neutral strategies) aim at exploiting price differences between different investment instruments, whose prices are related to some underlying economic relation. The strategies are based on the assumption that over a long-time horizon prices tend to move toward their intrinsic values. Once misvaluations in asset prices have been corrected over time, asset prices converge back to an equilibrium state. At the same time, the different kinds of risk (such as market, sector, or interest rate risks) should be eliminated. This means that, for example, the beta or duration of the overall investment portfolio is approximately zero. Relative value strategy types are equity market neutral, fixed income arbitrage, and convertible arbitrage strategies. For a description of the different strategies, see e.g. Hedge Fund Research Inc. (2007a), Credit Suisse Tremont Index LLC (2007) or AIMA and ASSIRT (2007).

EVENT-DRIVEN STRATEGIES

These strategies are based on the observation that certain events may result in a new valuation of companies and, hence, there will be a corresponding change in prices given such events. Possible events might be mergers and acquisitions, spin-offs and carve-outs, financial decisions like initial public offerings, capital increases, or share repurchases as well as restructuring activities. Such events may particularly affect the prices of corporate stocks and bonds. Typical strategies include merger arbitrage or distressed securities strategies.

OPPORTUNISTIC STRATEGIES

These strategies are based on the assumption that some market participants have better forecast abilities than others and, hence, there is a situation of information asymmetry. Opportunistic strategies include global macro, long short equity or equity hedge i.e., long short equity, equity hedge, short selling, and emerging markets strategies. Concentrating on securities in emerging markets, an emerging markets strategy aims at earning abnormal returns by exploiting inefficiencies in the valuation of equity and fixed income securities in less-developed regions.

An example of a global hedge fund index is the Greenwich Global Hedge Fund Index, see Greenwich Alternative Investments Research Inc. (2006). This index consists of 13 different types of strategies. Another example is the HFRX Global Hedge Fund Index that includes strategies such as convertible arbitrage, distressed securities, equity hedge, and equity market neutral strategies, see Hedge Fund Research Inc. (2007b). The dynamic weighting of these strategies, that is, asset weighting, allows for a representation of the overall hedge fund universe.

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Global Macro

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Global macro—one of the oldest hedge fund strategies—is trading based on economical/political/sociological factors, so-called "fundamental factors" that move market prices of currencies, bonds, equities, and commodities. Normally global macro traders/investors, which are trying to uncover imbalances within or between the major asset classes, wait for a catalyst that will unravel the assumed dislocations and make leveraged bets on the "anticipated" price movement, that can be referred to as far-from-equilibrium conditions. The macro part of the name derives from the hedge fund managers' attempts to use macroeconomic principles to identify dislocations in asset prices while the global part suggests that such imbalances are sought anywhere in the world. However, in recent years more and more global macro managers use a combination of a broad top-down macro analysis with a bottom-up micro analysis of individual companies in specific sectors from attractive countries. Global macro trades can be classified as either directional, where an investor bets on discrete price movements such as buying commodities or selling short U.S. bonds, or relative value, where two similar assets are paired in a long/short trade to exploit a perceived relative mispricing such as selling long-term bonds against bonds with shorter maturities. Normally, relative value trades have a significant lower volatility than directional trades. Approaches in finding profitable trades can be classified as either discretionary or systematic. Discretionary trading is based on a manager's subjective opinion or market conditions while systematic trading is based on signals of a quantitative model. Burnstein (1999) and Drobny (2006) provide a detailed description of different global macro investing concepts and strategies.

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Goldman Sachs Commodity Index

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The Goldman Sachs Commodity Index (GSCI) is a world-production-weighted commodity index, incorporating twenty-four commodity futures contracts that span five commodity sectors: energy, industrial metals, agriculture, livestock, and precious metals. This index was launched in 1991 and was designed to be a benchmark for commodity

investors comparable to the S&P 500 equity index. At the time the GSCI was launched, Walton (1991) put forth the case for investing in backwardated commodity futures contracts, adopting a Keynesian view on the commodity markets. Walton explained that

> In general, backwardation will be greatest in markets where commodity prices are very volatile, producers are very sensitive to commodity price fluctuations, and when it is costly to have large holdings of inventories (e.g., oil, … [base metals, and livestock]). If any of these conditions fail to hold, the excess return will diminish. For this reason, backwardation is usually greatest in markets in which commodities are consumed as they are produced and holdings of stocks are small because they are expensive to store or unsuitable for storage. These commodity markets are then more prone to supply disruptions, and as a result, there is frequently a premium in the spot market for physical possession.

It was with this theoretical backdrop that the GSCI was launched. At the time the GSCI was launched, it was largely weighted in commodities that had been historically backwardated. According to Rohrbein (2007), as of February 2007, the GSCI had "an estimated $60 billion in institutional investor funds tracking it, the majority of that coming through over-the-counter transactions." On February 6, 2007, it was announced that Standard and Poor's would be acquiring the GSCI, and that the index would be renamed, the S&P GSCI Commodity Index.

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Grain Futures Act

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The Grain Futures Act of 1922 is a federal statute passed on September 21, 1922 by the U.S. Government. It enacted a law that trading in grain futures must occur on regulated commodity exchanges and established a policy of trading transparency by requiring exchanges to increase the amount of information available to the public (see Hoffman, 1931). Only exchanges that behaved accordingly could be designated as a contract market by the Secretary of Agriculture. The law states that if the Secretary of Agriculture has reason to believe that any person "is attempting to manipulate the market price of any grain," then this person could be excluded from market trading. The primary purpose of the legislation was to control "excessive speculation." This phrase is found repeatedly in the Grain Futures Act and was used to justify the creation of limits on speculative practices, but the term "excessive speculation" was actually not defined so that its exact meaning remains vague. The enforcement of this act became very difficult, however, since disciplinary consequences were taken against the exchange itself and not against individual traders. Consequently, it was revised in 1936 by the Commodity Exchange Act and was superseded in 1974 by the Commodity Futures Trading Commission (see Pashigian, 1986).

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Grandstanding Problem

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To understand the significance of the grandstanding problem (Gompers, 1996), one must remember a fundamental characteristic of the world of private equity and venture capital that is related to the relationship between returns and deals conducted. By now it is a well-known fact that the overall return for venture capitalists depends on a small number of deals or rather a small number of financed companies. Successful investments, in other words those that guarantee the highest performance, can be attributed to ventures that culminate in an IPO (i.e., with the listing of the financed company). Consequently, the IPO is the best method available to venture capitalists to build their reputation and become successful players, or at least players capable of building the business of the companies they finance.

The grandstanding problem is a flaw in this mechanism and is actually caused by opportunistic behavior by venture capitalists. Specifically, they could opt to list a company prematurely, simply to build their own reputation on the market. Following this rationale, people with little experience are especially keen to list companies on the market for their own ulterior motives (reputation build up) rather than to generate value for all the shareholders.

The consequences of listing an immature company are essentially two (Keung, 2003): major underpricing on the first day of listing, due to greater information challenges and investors' fear for adverse selection problems, and a substantial slowdown in corporate development, because after the IPO the venture capitalist would no longer be there to provide company advice and nonfinancial resources.

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Greenshoe

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A greenshoe is also called an overallotment option, referring to the amount of shares offered in an initial public offering (IPO) or in a follow-on offering. If the demand for a security issue is higher than expected, the underwriter can sell additional shares up to 15% of the planned number of shares. This greenshoe option shall provide more price stability and liquidity in the market. Since the underwriter wants to avoid that shares fall below their offering price, they often oversell the offering. So that when the shares tend to go down, the underwriter

can buy back the oversold shares from the market. In this case, the greenshoe option is abandoned. However, with rising prices of the stock the underwriter would have to buy back the shares at a higher price compared to the offering price. To avoid this loss, the greenshoe option is exercised: the underwriter can buy additional shares from the issuer at the offering price. Another possibility without overselling the offering is the deferred settlement. Here an investor agrees to receive his shares from the offering not until the end of a lending period (e.g., a month). If during that time the price of the shares needs to be stabilized, the underwriter will buy back the agreed number of shares from the market and if the price rises, the underwriter will purchase the additional shares at offering price from the company. The general term refers to the fact that the Green Shoe Company was the first to introduce that kind of option.

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Greenshoe Option

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The greenshoe option, also known as the overallotment option, is a tool used by a company and a financial intermediary (the bookrunner) to stabilize the company shares price after an IPO (CESR, 2002; FSA, 2007). The term comes from the Greenshoe Manufacturing Company, which used this technique for the first time, giving the intermediary who was following the listing process the chance to buy an additional quantity of shares at the issue price for the IPO; these shares would be sold in case of excessive demand.

A greenshoe is an option to buy shares issued by a company in the process of being listed to the benefit of the bookrunner who follows the operation, with a strike price equal to the share price at the IPO. Normally, these options have a 30-day expiration. The stabilization mechanism that takes effect with a greenshoe is based on the behavior of the intermediary who holds the option. In fact, the intermediary charged with stabilizing the share price takes a long position on the option (as a holder), and in order to achieve the correct balance, a short position on the market, short selling a number of shares equal to that established in the greenshoe at a price very near to the offer price (Oehler et al., 2004). If the share price falls, the intermediary does not exercise the greenshoe option and buys the shares to close the short position and the security lending with the issuer. By doing so, demand is stimulated and, consequently, the price is kept steady. If, on the contrary, the share price rises, the intermediary exercises the option and issues new shares on the market, stopping or slowing the price upsurge.

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Gross Spread

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When a firm goes public in the equity market, it typically engages an investment bank (underwriter) to oversee the valuation, marketing, and legal aspects of the offering. Moreover, in a firm commitment (underwritten) offering the investment bank guarantees the sale of a specified number of shares at a designated offer price, thereby guaranteeing the issuing firm a set level of proceeds. As such, the risk of sale is transferred from the issuer to the underwriter. In exchange for this guarantee, and as compensation for other services performed, the underwriter charges a gross spread on the offering.

The gross spread is specified as a percentage of the proceeds from the offering. For the majority of standard-sized equity issues, the gross spread is relatively fixed at the 7% level. For the smallest offerings, primarily penny stock issues, the risk is higher, and therefore, spreads tend to be larger. Most of these issue types face a gross spread of 10%. For larger offerings, economies of scale and reduced pricing risk typically result in lower gross spreads, likely in the 4–5% range.

Gross spreads are not specific to equity issues, but are generally applied in any situation where the investment bank is underwriting a security issue. The other common occurrence, therefore, deals with the public issuance of debt. In such cases, the gross spread percentage is much smaller (typically around 2%, on average), as there is less pricing risk associated with debt issues relative to equity issues.

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Guaranteed Introducing Broker

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A guaranteed introducing broker (GIB) is a legal entity or an individual that offers futures market brokerage services. A GIB has to be a member of the National Futures Association (NFA), which is responsible for registration and general supervision, and it must be registered with the Commodity Futures Trading Commission (CFTC) to whose regulation it is subject. Furthermore, GIBs are subject to the regulation of the respective commodity exchanges. The operations of a GIB are guaranteed by a futures commission merchant (FCM). Before granting the license for a GIB, the NFA requires the guarantor FCM to file a written guarantee agreement as well as certification concerning the accurateness and completeness of the provided information. The agreement fixes the FCM's obligation to assume financial responsibility for the GIB's futures market activities.

A GIB takes customer orders and transmits them exclusively to its guarantor FCM for handling. While an FCM is able

to mitigate the counterparty risk by, for example, obligating the customer to pay and maintain a margin deposit, a GIB does not accept any collateral regardless whether it includes money, securities, or property. However, since all its accounts are carried by the guarantor FCM and due to the given guarantee, the GIB itself does not have to meet minimum capital requirements and does not have to provide financial reports.

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H

Hedge

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A hedge is a trade designed to reduce risk (Hull, 2006). The hedge ratio is another concept related to this definition. A hedge ratio is the ratio of the size of a position in a hedging instrument to the size of a position being hedged. There are many different ways to compute the hedge ratio. In the simple case of an European call, the hedge ratio is the inverse of the delta of the call defined by: delta $= e^{-q(T-t)}N(d_1)$, with q being the continuous dividend yield and $N(\cdot)$ the cumulative function of the normal distribution. There are many ways to hedge. One popular method to compute the hedge ratio has been developed by Witt et al. (1987). This method consists in the regression of the spot price of a security over its future price: $S_t = \beta_0 + \beta_1 F_t + \varepsilon_t$, where S_t is the spot price, F_t the future price, and ε_t the innovation. In this equation, β_1 is the hedge ratio. In practice, the method to estimate this hedge ratio is the ordinary least squares (OLS). Brown (1985) proposes to compute the hedge ratio using the percentage change of S_t and F_t in the regressions. The idea behind this procedure is that these prices are not stationary. Therefore, it seems preferable to relate these two prices by an error correction model because they seem to be cointegrated. Wilson (1983) estimates the hedge ratio using the change in the spot and future prices. In this case, the computation of the hedge ratio corresponds to the minimization of the variance of $\Delta S - \beta_1 \Delta F$, β_1 being the hedge ratio. A hedged portfolio is not necessarily a portfolio whose beta is equal to zero and there may be a nonlinear relation between the return of a portfolio and the return of the market. However, we cannot resort to the correlation coefficient to judge the relationship between two variables when there is a nonlinear association between them (Bellalah, 2003; Myers and Thompson, 1989; Racicot and Théoret, 2004, 2006).

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Hedge Fund

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> "A hedge fund is a portfolio that is structured as a limited partnership between a small number of partners. It entails incentive fees, does not have any investment constraints and is generally of low liquidity and has a low degree of transparency of the portfolio positions. It often displays creative and new investment techniques, with exposure to alternative premiums and delivering returns that are due to market inefficiencies. A lot of the investments are considered unscalable."

A hedge fund is not hedged in terms of not having exposure to the underlying market. It can be, but this is not a prerequisite for being a hedge fund. Thus, a hedge fund can simply be long or short financial products.

Limited partnership means the managers do not bear responsibilities for where they invest their clients' money. It can be risky for an investor to give money to these managers. Low liquidity means the financial products in the respective portfolio are difficult to liquidate/sell in the financial market as there is no appropriate pricing available within a short or reasonable time period. At times this can mean days or weeks before a cash flow can be obtained. Low transparency means that the financial products, in which the hedge fund is invested, will not be disclosed to the final investors.

Alternative premium means the returns received by being exposed to credit risk (e.g., buying a risky bond), to interest rate risk (e.g., buying a long-term bond), liquidity risk (e.g., investing in small capitalization stocks in Korea) and volatility risk (e.g., being exposed to panic on the market, short options strategies).

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Hedge Fund Replication

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Hedge fund replication is driven by the investor's desire for liquidity, transparency, low fees, and the need to arrive at a

meaningful benchmark for products that managed to escape benchmarking for a (too) long time. Broadly we can distinguish factor-based models based on mean–variance portfolio theory as proposed by Lo and Hasanhodzic (2007) and models based on no arbitrage capital market equilibrium and stochastic discount factors as suggested by Kat (2007).

Factor-based models attempt to find the best tracking portfolios out of a set of pre-specified macro risk factors (value, size, credit, commodities, …), option strategies (short put, look-back, …), and naive active strategies (forward rate bias, momentum, equal weighting, …). Typically linear regressions (equivalent to finding the combination of factors that minimize the tracking error between fund and replicating portfolio) or Kalman filter techniques (to allow for time varying exposures) are used. The resulting combination of factors that tracks a hedge fund (index) best is said to be a clone of this index. The intercept from this regression (alpha) measures the amount of real skill that is neither subsumed in risk taking or in engineering bets on infrequent events nor inherent in naïve strategies widely known to the market. In essence it is what is worth paying for and what makes a hedge fund unique. In spirit this is identical to the so-called mean–variance spanning tests. Though intuitively appealing, the shortcomings of this approach are manifold. Potentially missing factors, limited account of dynamic trading, the assumption of normality, and most of all the very limited out of sample explanation of individual as well as hedge fund indices put a dent into its practical importance.

Models based on stochastic discount factors attempt at generating the same distributional characteristics as the targeted hedge fund. Dybvig (1988) has shown how arbitrary dynamic trading strategies can be priced in capital market equilibrium. This has two immediate consequences. Kat first arrives at a performance measure that is deeply rooted in economic theory and independent from distributional assumptions. As such it is preferable to mean–variance-based factor models that do not provide this generality. Second, once we can price a given return stream, we can also derive its dynamic hedging policy. This directly leads to the implementation of a replication program.

While cloning hedge funds is the correct way to evaluate the alpha generating abilities of a hedge fund manager and therefore it allows a much better discussion about the level of fees justified by a particular product offering, it is not clear investors want to invest in clones. After all, hedge fund replicating portfolios are complex beta bundles and the real question is whether investors need that bundle in the first place. In other words, investors would be better off to decide first which betas they need (in a corporate risk management or pure asset allocation context) and then where to source them from.

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Hedge Ratio

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The hedge ratio is the amount of an asset to be held for hedging a given position on another asset whose price depends on the first one. Let S be the price of an asset (underlying) and $F(S)$ the price of another asset (derivative) depending on S, then the value of a portfolio (Π) containing θ_S of the underlying and θ_F of the derivative is

$$\Pi = \theta_S S + \theta_F F(S) \tag{1}$$

This portfolio is hedged against the changes in the price of the asset S if the derivative of Π with respect to S equals zero. This leads to

$$\frac{\theta_F}{\theta_S} = -\frac{1}{\partial F(S)/\partial S} \tag{2}$$

that is, the hedge ratio (θ_F/θ_S) is the opposite of the inverse of the derivative of F with respect to S. Accordingly

1. If F positively depends on S (i.e., $\partial F/\partial S > 0$), then hedging asks for weights on F and S to have opposite sign (i.e., if θ_S is positive, then θ_F must be negative and vice versa).
2. If F negatively depends on S (i.e., $\partial F/\partial S < 0$), then hedging asks for weights on F and S to have the same sign (i.e., θ_S and θ_F both positive or negative).
3. If F does not depend on S (i.e., $\partial F/\partial S = 0$), it is impossible to hedge the position on S by using the asset F.

Since the value of the derivative $\partial F/\partial S$ changes over time, then the weight of the asset F in the hedged portfolio must be suitably rebalanced over time (which could lead to high transaction costs).

DELTA HEDGING

When $F(S)$ is an option on the asset S, the derivative $\partial F/\partial S$ is called "delta" (Δ) and the hedge ratio is called "delta hedging." Algebraically

$$\frac{\theta_F}{\theta_S} = -\frac{1}{\Delta}$$

which is merely a particular case of the hedge ratio (Equation 2).

GAMMA HEDGING

In order to reduce the frequency of portfolio rebalancing, the hedging can be made against bigger changes in the price of an asset (S). Thus, both the first and the second derivatives of the portfolio with respect to the changes in S are set to zero. This strategy needs the use of two derivatives on S (let us call them F_1 and F_2) and the portfolio value is

$$\Pi = \theta_S S + \theta_{F_1} F_1(S) + \theta_{F_2} F_2(S)$$

Let Δ_1, Δ_2 and Γ_1, Γ_2 be the first and the second derivatives of F_1 and F_2 with respect to S. Then the allocation setting to zero both the first and the second derivatives of Π with respect to S is

$$\frac{\theta_{F_1}}{\theta_S} = -\frac{\Gamma_2}{\Gamma_2\Delta_1 - \Gamma_1\Delta_2}$$

$$\frac{\theta_{F_2}}{\theta_S} = \frac{\Gamma_1}{\Gamma_2\Delta_1 - \Gamma_1\Delta_2}$$

A gamma-hedged portfolio is also delta hedged (the opposite is not true). Furthermore, the gamma-hedged portfolio requires less rebalancing then the delta hedged one.

MINIMUM VARIANCE HEDGE RATIO (MVHR)

Let us take portfolio (1). If it is autofinanced, then its payoff (i.e., the change in its value $\Delta\Pi$) is given by

$$\Delta\prod = \theta_S \Delta S + \theta_F \Delta F$$

The MVHR (Johnson, 1960) is the amount of asset F (with respect to the amount of asset S) that must be held in order to minimize the variance of portfolio payoff ($\sigma^2_{\Delta\Pi}$). Algebraically

$$\sigma^2_{\Delta\Pi} = \theta_S^2 \sigma^2_{\Delta S} + \theta_F^2 \sigma^2_{\Delta F} + 2\theta_F \theta_S \sigma_{\Delta S, \Delta F}$$

where $\sigma_{\Delta S, \Delta F}$ is the covariance between ΔS and ΔF.

When we set to zero the derivative of $\sigma^2_{\Delta\Pi}$ with respect to θ_F, we obtain the MVHR as

$$\frac{\theta_F}{\theta_S} = -\frac{\sigma_{\Delta S, \Delta F}}{\sigma^2_{\Delta F}}$$

which strongly relates to the beta of the capital asset pricing model.

A simple measure of the hedging effectiveness (E) is the one's complement of the ratio between the variances of the hedged and the unhedged portfolio:

$$E = 1 - \frac{\theta_S^2 \left(\sigma^2_{\Delta S} - \dfrac{\sigma^2_{\Delta S, \Delta F}}{\sigma^2_{\Delta F}} \right)}{\theta_S^2 \sigma^2_{\Delta S}} = \rho^2$$

where ρ is the correlation coefficient between ΔS and ΔF.

More recent contributions compute the hedge ratio maximizing the expected utility of an agent (Boveroux and Minguet, 1999) or minimizing the *value at risk* of a portfolio (Jui-Cheng et al., 2006).

HEDGE RATIO ESTIMATION

The hedge ratio (Equation 2) can be estimated by applying the ordinary least squares to

$$\Delta S_t = \alpha + \beta \Delta F_t + \varepsilon_t$$

where ε_t is the error; α should not be statistically different from zero and β is the (opposite of the) hedge ratio. Other regression models (like error correction models, GARCH, and EGARCH) can of course be applied.

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Hedging

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Hedging is defined as the method to minimize the exposure to risk while enjoying the profit from an investment. One well-known way of hedging is the investor's buying the underpriced security and associating this buying with a short sale of other securities to guarantee the avoidance of risk

under any possible behavior of the market. In this regard hedging can be assessed as some sort of an insurance against damaging events as a consequence of which loss is minimized. Investors must use advanced strategies to find instruments to offset the risk of unexpected price movements. This requires investing in different alternatives that are negatively correlated. Negative correlation implies that the movements of two investments will be in opposite directions, at the expense of sacrificing the opportunity cost of getting the higher return with assuming higher risk. A desire for greater profit is always associated with greater risk. Therefore, hedging can be considered as a diversification of risk among alternative investment opportunities. The framework of the risk–return tradeoff draws the borderline for hedging attempts. Apparently, the risk is reduced by hedging but this further adds to the potential of higher profit. Risks to be avoided through hedging can be due to interest rate, equity, credit, or currency.

Initial opinions about hedging can be traced back to Marshall (1919) who expressed that hedging is not speculation but insurance. Keynes (1930), the founder of the economics school of thought known by his name, also stated that hedging is used as a means for avoiding risk. Stein (1961) realized that hedging was a way of maximizing expected utility out of the assets owned in the framework of the portfolio theory. Kamara (1982) contributed to the theory by claiming that the main purpose in hedging is the desire to stabilize income and increase expected profits.

The most remarkable hedging practice was by Alfred Winslow Jones, who introduced the first hedge fund in 1949. Jones established an investment fund that would offset long positions in undervalued equities by short positions and used leverage since the capital he could invest was limited. It is interesting to note that the words "hedge funds" are derived from the word "hedging" and are supposed to manage and decrease risk but they assume a greater amount of risk than the market with strategies such as short selling, leveraging, and arbitrage. As a consequence of failure in managing risk successfully, history has witnessed collapses of hedge funds in the late 1990s and early 2000s. Hedging used by firms have become more complicated and sophisticated as modern markets are subject to risks from numerous sources as a consequence of globalization.

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HFRI Convertible Arbitrage Index

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The HFRI (Hedge Fund Research Index, www.hedgefundresearch.com) Convertible Arbitrage Index is an equally weighted performance index of the convertible arbitrage hedge funds.

To be included in this index, the hedge funds must fulfil the following criteria:

- Report monthly returns to HFRI
- Report net of all fees returns
- Report assets in USD

There is no required asset-size minimum to be included in the HFRI Convertible Arbitrage Index; the names of the individual hedge funds are not disclosed and there is no requirement for a certain track record length to be part of the index. A fund that does not report any longer will have its past returns kept in the index but will not be used in the future (possible survivorship bias). There is a built-in yield advantage in keeping the convertible bond rather than converting into the underlying equity. This advantage is called the "income advantage," which is the additional income above holding the simple share. Some call it a "complexity" premium.

The convertible bond has several risks: equity risk, credit risk, credit spread risk, interest rate risk, call risk, liquidity risk, takeover risk, volatility risk, and valuation risk. To hedge these risks, several techniques can be used:

- Short delta stocks where delta comes from the option's delta
- Credit default swaps to hedge the credit bond risk
- Short interest rate future to hedge a sudden rise in the interest rates
- Use complex but correct models to buy and sell the convertible at the correct price

A convertible bond is composed of two parts: a call option:

$$c = s\Phi(d_1) - xe^{-rt}\Phi(d_2)$$

$$d_1 = \frac{\log(s/x) + (r + \sigma^2/2)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

and a bond

$$B = \frac{c}{(1 + i_{t1})} + \frac{c}{(1 + i_{t2})^2} + \cdots + \frac{c}{(1 + i_{tn})^n} + \frac{P}{(1 + i_{tn})^n}$$

where c is the call option, s is the stock price, x is the strike price, r is the annual risk-free rate, σ is the annual standard deviation, t is the time to expiration, B is the bond price, c is the bond's coupon, n is the number of coupons, i_{t1}, …, i_{tn} is the forward interest rate curve and P is the bond's value at maturity.

The convertible holder will make gains when the bond increases in value, the stock increases in value, or the call option increases in value. The traditional model of bond value plus call option value works well for traditional convertible bonds. However, it does not account well for more complex structures. A different technique to evaluate convertible securities is the binomial tree with one factor.

The convertible can be arbitraged using the following five techniques:

- Gamma trade: the holder of the convertible bond sells more underlying equity when the stock just went up or buys more underlying equity when the equity just went down. This technique requires volatility in the underlying equity.
- Carry trade: buy out-of-the-money convertible, sell delta stocks. The carry equals bond coupon + short rebate

from sold stocks − dividends on sold stocks − financing costs. Some managers sell more stocks than implied by the option's delta in order to be overhedged in case of a sudden deterioration in the company's credit. The aim is to make money just by carrying the convertible with leverage. This is often done with U.S. high-yield convertibles, because they deliver high bond coupons.

- Synthetic calls: buy out-of-the-money convertible, sell underlying bond, and keep the out-of-the-money call option.
- Synthetic puts: buy in-the-money convertible, sell Δ_1 underlying stock, receive the coupon, and pay the dividend. A decrease in stock is much faster than a decrease in convertible, which results in a profit if the stock goes down.
- Discount convertible: purchase an inexpensive convertible and attempt to short sell the stock. The manager expects the market to recognize the true value of the convertible, which will result in a convertible bond profit.

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HFRI Distressed Index

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The HFRI (Hedge Fund Research Index) Distressed Index is an equally weighted performance index of the distressed hedge funds. To be included in this index, the hedge funds must fulfill the following criteria:

- Report monthly returns to HFRI
- Report net of all fees returns
- Report assets in USD

There is no required asset-size minimum to be included in the HFRI Distressed Index; the names of the individual hedge funds are not disclosed and there is no requirement for a certain track record length to be part of the index. A fund that does not report any longer will have its past returns kept in the index but will not be used in the future (possible survivorship bias).

There is an advantage in terms of return in holding companies that are either near bankruptcy or have problems paying their debt. The distressed managers focus on healthy underlying business or fraud. Companies that are part of an industry-wide malaise and/or feature excess capacity are no candidates. This is due to uncertainty of the company's future. Some people call it a "liquidity" premium.

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HFRI Fund Weighted Composite Index

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The HFRI (Hedge Fund Research Index, http://www.hedgefundresearch.com) Fund

Weighted Composite Index is an equally weighted performance index of the HFRI hedge fund strategy indices. The HFRI hedge fund strategy indices are broken down into 32 different indices (the fund of funds indices are not included in the HFRI Fund Weighted Composite Index) and are not investable.

To be included in this index, the hedge funds must fulfill the following criteria:

- Report monthly returns to HFRI
- Report net of all fees returns
- Report assets in USD

There is no required asset-size minimum to be included in the HFRI Fund Weighted Composite Index; the names of the individual hedge funds are not disclosed and there is no requirement for a certain track record length to be part of the index. A fund that does not report any longer will have its past returns kept in the index but will not be used in the future (possible survivorship bias).

The HFRI Fund Weighted Composite Index contains around 49% equity hedge, 10% event driven, 9% emerging markets, 8% macro, 8% convertible arbitrage, 7% relative value, 5% fixed income, and 4% distressed hedge funds.

High Watermark

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Literally speaking, a high watermark indicates the highest level that a body of water has reached during a certain period of time. The term is often used in a figurative sense as the all-time high of a variable in the past, for example, the highest peak of the market value of an investment fund. Performance fees are of substantial importance in particular in the hedge funds industry (see Brown et al., 1999). Positive performance fees for managers of hedge funds are typically paid only if the market value of the investment fund managed by him or her exceeds the previous high watermark. Such an arrangement prevents the fund manager from earning a positive performance fee even if he or she has lost money in comparison to past high values of his or her investment funds. The agreement on high watermarks is important because performance fees are generally restricted to nonnegative values so that investment managers with poor performance do not have to incur penalty payments (see Stracca, 2006). Without the application of high watermarks, the investment manager's performance fee would simply be piecewise linear with a slope of zero for negative annual fund returns and a positive slope for positive annual fund returns. The establishment of a high watermark implies a "dynamic" kink of this incentive scheme that shifts to positive annual returns when past high watermarks are violated at the beginning of the current period for which the incentive fee is to be computed.

For example, a fund starts at the beginning of year 1 with an amount of $180,000 under management and reaches a peak of $200,000 at the end of year 1. Then its value decreases to $150,000 at the end of year 2 and eventually increases once again to $170,000 at the end of year 3. Every year, the manager gets a performance fee that amounts to 20% of the (positive) value creation during the respective year. Without a high watermark being in effect, the manager gets fees amounting to $4,000 in year 1, $0 in year 2, and again $4,000 in year 3. The recognition of a high watermark arrangement implies

payments of $4,000 in year 1 and $0 in year 2 and year 3 to the manager.

According to Goetzmann et al. (2003), high watermark arrangements lead to option-like incentive schemes for managers of hedge funds. As hedge funds typically employ rather high-variance portfolio strategies that are based on superior knowledge, high watermarks assure the long-term attractiveness of such strategies for fund managers. Moreover, such bets on "superior manager skills" may imply diminishing returns to scale in the hedge fund industry so that growth opportunities for hedge funds are rather limited and—as a consequence—asset-based fees (simply amounting to a fixed percentage of the total volume of assets under management) will not work as an effective reward scheme for successful investment managers.

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A high net worth individual (HNWI) is generally defined as a person with financial assets greater than USD 1 million. Within the past few decades, this level of wealth has become increasingly common due to inflationary and wealth effects as well as the depreciation of the U.S. dollar against numerous foreign currencies. The net worth is the sum of all financial assets minus liabilities. The assets exclude the real estate used for primary residences, which accounts for the greatest portions of wealth among U.S. households, and fixed assets such as the car and furniture. In 2005, there were 8.7 million HNWIs globally. A further category used is ultrahigh net worth individuals (UHNWIs), comprised of individuals with financial assets greater than USD 30 million and making up approximately 0.9% of all HNWIs. There are approximately 70,000 UHNWIs in the global population with 54,000 or 77% residing in the United States and Europe.

The third category of extreme wealth constitutes the category "billionaires." According to Forbes' 2007 annual list of the wealthiest individuals there are 946 U.S.-dollar billionaires in the world. Merrill Lynch and CapGemini publish annually the "World Wealth Report" that portrays the HNWIs market in detail. To derive the numbers of HNWIs, the authors use macroeconomic analysis, in which they estimate the total wealth of a single country and determine its distribution among the population. From this sample they derive the number of HNWIs in each country. There are businesses that focus exclusively on HNWIs or UHNWIs and their explicit needs. These include, for example, family office services, jewelry brokers, kidnap and ransom insurance, personal health manager, and yachting.

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Higher Moments

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A moment is a statistic value calculated on the basis of a series of numbers. Moments give information on the shape of a distribution of a series of numbers (returns in the case of performance analysis). A normal distribution is defined by its first two moments that are the mean and the variance.

$$\text{Mean} = m_1 = \frac{1}{n}\sum_{i=1}^{n} n_i(x_i - x_n)$$

$$\text{Variance} = m_2 = \frac{1}{n}\sum_{i=1}^{n} n_i(x_i - x_n)^2$$

The first moment (the mean) gives information on the average of the distribution, while the second moment (the variance) provides information on the variability, also known as the spread or the dispersion of a series of numbers. The square root of variance is usually used as a measure of the volatility in the series.

The third moment is used to estimate skewness. Skewness measures the asymmetry of the distribution. A symmetric distribution of returns will have a skewness of zero. A negatively skewed distribution will be skewed to the left. In this case, the tail of the distribution will be fatter on the left. A positively skewed distribution will be skewed to the right. The tail of the distribution will be fatter on the right. Skewness is defined as:

$$\gamma_3 = \frac{m_3}{\sigma^3} \quad \text{with} \quad m_3 = \frac{1}{n}\sum_{i=1}^{n} n_i(x_i - x_n)^3$$

Figure 1 illustrates the difference between positive and negative skewness. The left-hand side distribution is positively skewed as the tail of the distribution is heavier on the right. The inverse is true for the right-hand side distribution that is heavier on the left and is negatively skewed. Investors like skewness since positively skewed distributions tend to offer values over the average with a limited downside.

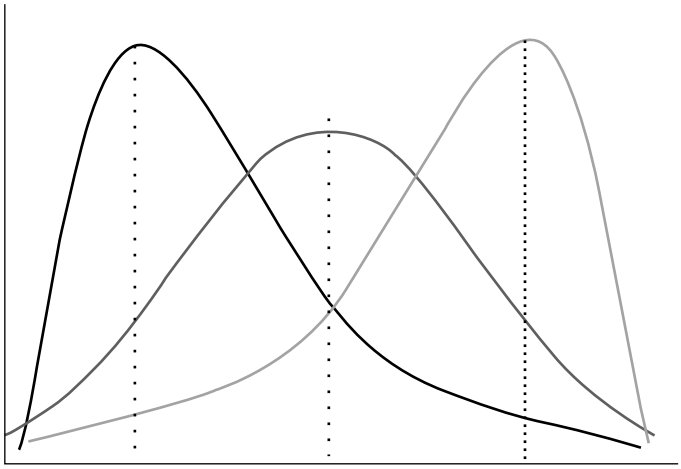

FIGURE 1
Illustration of positive and negative skewness.

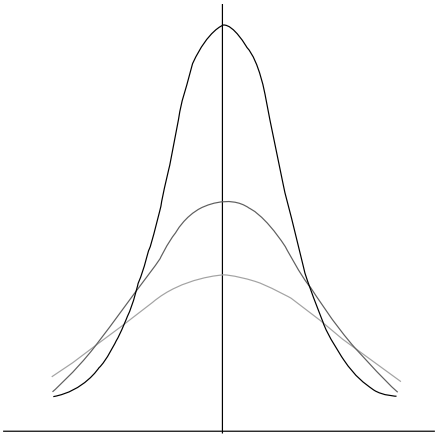

FIGURE 2
Illustration of positive and negative kurtosis.

The fourth moment is used for the estimation of the kurtosis of the distribution. Kurtosis gives information on the peakedness of a distribution. The kurtosis is a measure of whether the distribution is tall with smaller tails (leptokurtic distribution) or short with fatted tails (platykurtic distribution) than the normal distribution of the same variance. Kurtosis is defined as:

$$\gamma_4 = \frac{m_4}{\sigma^4} - 3 \text{ with } m_4 = \frac{1}{n}\sum_{i=1}^{n} n_i (x_i - x_n)^4$$

Figure 2 illustrates the difference between a distribution with positive kurtosis and negative kurtosis. The tall distribution has a low kurtosis, while the short one has a larger kurtosis. Investors do not like high kurtosis because the distribution of returns has a bigger chance of fat tails, that is, a higher risk of extreme returns.

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Hurdle Rate

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A hurdle rate is, in general, the minimum rate of return of an investment so that certain events take place. In particular, the minimum (expected) rate of return so that an investment is realized at all is called a hurdle rate (see Donaldson, 1972). Such hurdle rates are identical to costs of capital and enter quantitative capital budgeting decision problems. Corresponding adequate hurdle rates can be derived from formal capital market models like the capital asset pricing model. Moreover, in the private equity and venture capital industry, hurdle rates stand for minimum rates of return for external investors that have to be met, before the management of a private equity or venture capital company receives a bonus payment (called "carried interest"). The appropriate choice of such kinds of hurdle rates is the object of the agency theory that analyzes the possible incentive effects of different kinds of contractual designs. The implementation of hurdle rates leads to a specific class of incentive contracts that is denoted as piecewise linear with a kink or a jump discontinuity at the point where the hurdle rate is met (see Gjesdal, 1988).

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I

Implied Volatility

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Implied volatility is a term that is often found in the context of options. It refers to the volatility of a security, or another financial instrument underlying an option or financial instrument with embedded optionality, that is, given a particular theoretical option-pricing model, implied by the market price of the respective option or related instrument. Implied volatility is thus the volatility of the underlying instrument, which, when included in the theoretical pricing model, yields a theoretical value identical to the market value. Because of put-call parity, implied volatility should be identical for call and put options.

While historical volatility is a measure of the past, implied volatility reflects market expectations for the future of the underlying's price fluctuations over the remaining life of the option. If we analyze historical data, we find that the implied volatility is usually smaller and less volatile than the historical volatility, although both follow a mean-reverting process. The implied volatility of short-term options tends to be further from the mean than long-term options. In the long run, historical volatility is found to have the strongest influence on implied volatility. In the short run, near-future events such as OPEC energy announcements, earnings news, or takeovers are likely to increase implied volatility (see Natenberg, 1994).

Depending on the type of option (i.e., vanilla options, exotic options) and its return characteristics, different option pricing models may be used to derive implied volatility. The Black and Scholes (1973) formula is one of the most famous option pricing models. It is often used for basic financial instruments with approximately lognormal prices, such as European options with no dividends. This method is analytically advantageous. However, there are many modifications to the Black-Scholes model, along with alternative pricing methods such as binomial methods (Cox et al., 1979), analytical methods, and approximation methods that account for different option characteristics (i.e., the quadratic approximation of Barone-Adesi and Whaley, 1987). For a comprehensive overview see Haug (2006).

For example, if we use the Black-Scholes formula to derive the theoretical value of a call option C, the input variables would include (1) the volatility of

the underlying or the expected future volatility, (2) the expiry date of option, (3) the strike price of option, (4) the price of the underlying, (5) the prevailing interest rate r, and, in certain circumstances, (6) dividends paid by the underlying. The single nondirectly observable value would be the future realized volatility. Since the Black-Scholes option pricing function is strictly monotonically increasing in the volatility, in other words, if all other input variables are equal, there is only one single value for the theoretical option price for a certain volatility, it is possible to obtain the inverse function in the volatility of the pricing function, so that observed option market price implies a volatility which is referred to as implied volatility. If the call option's price is higher than null and lower than the price of the underlying, there is a one-to-one solution.

Option pricing models are generally rather complex. Thus there is often no closed-form solution for the implied volatility. However, a root-finding technique, such as the Newton-Raphson method, can be used to obtain a solution for it. Because of the rather high volatility of prices, it is important to use an efficient algorithm to obtain a solution for the implied volatility. If the pricing function, like the Black-Scholes formula, is well behaved, and there is a closed-form solution for vega, the Newton-Raphson method can be an extremely efficient method that can converge quadratically. However, if there are multiple local extrema, and vega must be estimated, other numerical methods (such as Brent's method) or approximations (such as the Brenner–Subrahmanyam formula) may be more efficient. For more details see Antia (2002) and Hallenbach (2004).

The observed implied volatility is usually not constant. It varies with different underlyings, strike prices, and expiry dates. This illustrates the limitations of the Black-Scholes formula, which states that there is only one implied volatility, independent of the strike price (see Figure 1). If all other input variables are equal, the graph of the implied volatility will have a characteristic shape, which is persistent over time and is characteristic of the respective option and market. Before the crash of 1987, the shape of the implied volatility relative to the expiry date was U-shaped, or what we call a smile (for more details see Fouque et al., 2000). However, since that time, the smile has

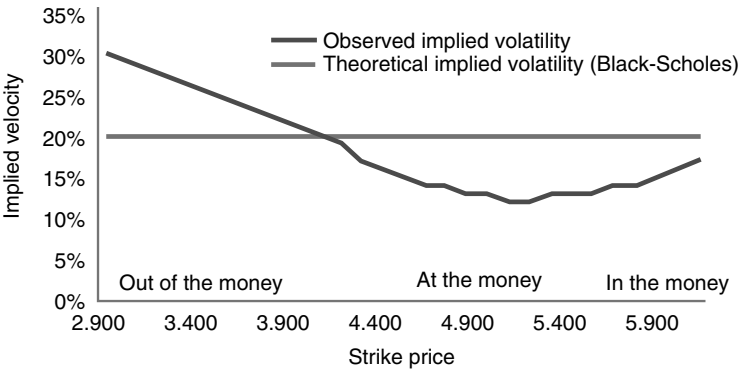

FIGURE 1
Implied volatility smile for put option on EuroSTOXX with 112 days to expiry.

transformed into a downward slope, which is referred to as skew (usually equity call options), or a smile/smirk (usually equity put options). Figure 1 shows the smile of an equity put option.

If a smile is observed, there is a premium for options with very high or very low strike prices that is not captured by Black-Scholes, which implies that options are no perfect substitutes for each other (see also Chance, 2004). One explanation for this phenomenon may be found in behavioral finance, which states that investors are willing to pay a premium to hedge their portfolio against extreme losses. The illiquidity of out-of-the-money options or stochastic volatility may also explain these approaches to the premium. However, in any event, theory does not capture what makes one option more desirable than another.

By considering the expiry as a second input variable, we can derive a static implied volatility surface that illustrates term structure and volatility smile at the same time (see Figure 2). In practice, a volatility surface can provide insight into whether there are any irregularities to be exploited. For the sake of interpretability, the input variables are usually standardized; thus, instead of the strike price, the spot moneyness is used. The high implied volatility of close-to-expiry, deep-in-the-money, and out-of-the-money options here is a result of the high bid-ask spread and is thus an illiquidity of the options. Furthermore, close-to-expiry options are not continuous, but exhibit discrete jumps.

In addition, the volatility surface is far from constant—it changes over time (the evolution of the implied volatility surface). Several rules and models exist to explain and

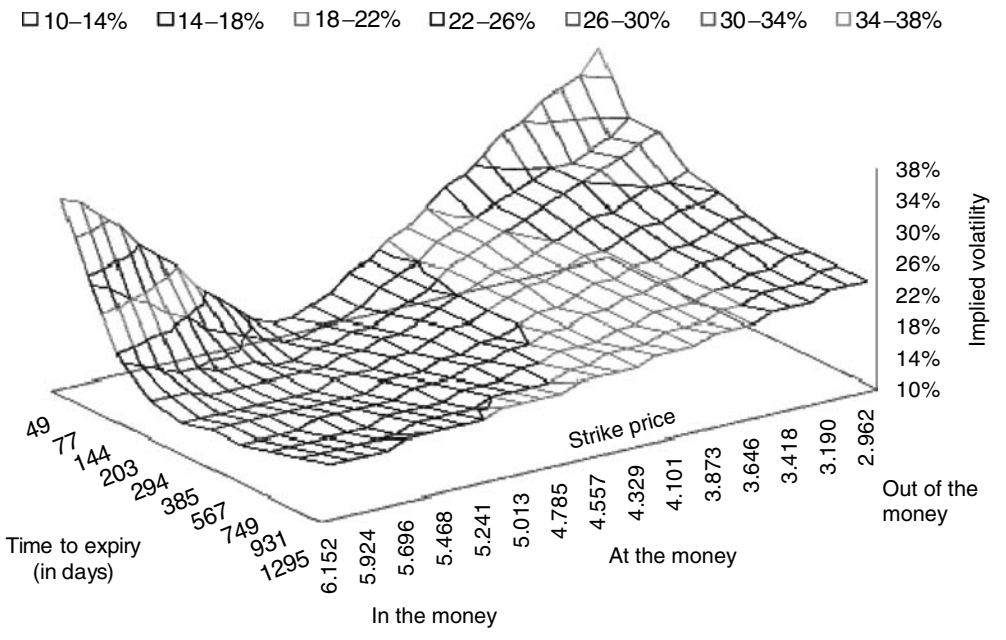

FIGURE 2
Implied volatility surface for put option on EuroSTOXX.

predict the development of the surface, that is, the stick-strike rule, the sticky-delta rule, and the sticky-implied-tree model (Derman, 1999). Several options exchanges offer (implied) volatility indexes like the Chicago Board Options Exchange Volatility Index (VIX) as a proxy for expected volatility.

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Incentive Fee

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An incentive fee (also called performance fee) is one part of the overall payments from investors to a fund manager for his or her services. The other part of the overall payments is called a fixed fee. The fixed fee component does not depend on the investment fund's (current) performance. Typically it is computed as a fixed percentage of the total volume of assets under management (asset-based fee). In contrast, the incentive fee is increasing in the realized rate of return of the fund under consideration. Incentive fees are generally utilized with respect to hedge funds, while mutual fund managers most often only earn a fixed fee (see Record and Tynan, 1987).

Incentive fees are considered to induce fund managers to work harder on portfolio optimization, as they participate in any excess return they are going to realize. Moreover, incentive fees should be most attractive for very competent fund managers. Through a self-selection process, investment funds that utilize incentive fees should attract more able fund managers than investment funds that only offer a fixed fee. Hard working and talented fund managers should imply particularly high rates of fund return, which is in the investor's interest. However, incentive fees may also cause some adverse incentive effects such as excessive risk taking. This is particularly true, when negative incentive fees for fund managers are excluded, as is typical for the hedge fund industry. For mutual funds, U.S. law requires incentive fees to be able to become negative as well: According to the 1970 amendment of the Investment Company Act 1940, incentive fees for mutual funds must be centered around an index and exhibit a symmetrical design of extra payments for results above the index and of penalty payments for a performance below the index. Because of risk aversion on the fund manager's side, such a kind of incentive fee is seldom accepted so that incentive fees are not frequently utilized by

mutual funds. In fact, according to Elton et al. (2003), in 1999, only 108 out of a total of 6,716 bond and stock mutual funds in the United States made use of incentive fees. They all applied upper and lower limits in order to restrict maximum and minimum amounts of incentive payments. In no case, overall fees for a fund manager could become negative (see Murphy and Bourgeois, 2006).

A sensible design of incentive contracts is a difficult task. Important components of incentive fees are a possible benchmark to assess the relative success of a fund manager, and contracting elements like the high watermark reduce the problem of only limited liability on the fund manager's side. However, only hedge funds are completely free in designing their incentive contracts in a suitable way (see Ackermann et al., 1999).

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Incubator

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According to the National Business Incubation Association (www.nbia.org), business incubation refers to "… a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts." What clearly emerge from this definition are the aims of an incubator and the distinctive characteristics that must be developed to achieve these aims.

The aim of an incubator is to produce successful companies, supporting their growth by supplying services and averting financial tensions that could negatively impact development. In other words, the primary objective of an incubator is to generate successful companies that are able to leave the support program as completely autonomous entities from a production and financial standpoint. What is more, business development lays the groundwork for attaining more far-reaching goals, such as creating jobs, improving a country's technology level, stimulating progress in underdeveloped areas, etc.

In order to reach these objectives, an incubator has to guarantee its customers—young companies with ample growth margins—a structured set of resources and services. These consist of managerial tools, financial and organizational consulting, adequate technical support, as well as logistical structures and equipment.

There are various kinds of incubators; the characteristics of each depend on a combination of certain variables:

Promoters: large industrial firms and/or service companies, universities, public agencies and bodies, financial intermediaries, investors

Specific goals: to create jobs, to revitalize and/or develop economically depressed areas, to diversify production, to conduct research and development, to transfer technology, to make a profit

Type of customer served: sector (artisan sector, manufacturing industry, information technology, etc.) or people targeted (students/researchers, entrepreneurs, women, ethnic minorities, etc.)

Services offered: logistical and infotech services (networks, information systems, infotech equipment, etc.), secretarial services (reception, handling phone calls, and mail), consulting and management (legal, fiscal, patents, work, etc.), training

Support model: the resources that enable the structure to function, for example, payment for services to company/customers, provision of services outside the incubator, public subsidies, sponsorship, royalties

Environmental context: The ability of the incubator to develop relationships and networks to support its "guests" depends on the management and characteristics of the promoters

Therefore, it is impossible to come up with a general classification of the external context *a priori*. Specifically, according to the most recent empirical studies, intersecting the variables leads to the creation of four different types of incubator that are distinctive in terms of their approach to companies and the range of services offered: business innovation centers (BICs), university business incubators (UBIs), independent private incubators (IPIs), and corporate private incubators (CPIs).

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Independent Introducing Broker

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An independent introducing broker (IIB) is a legal entity or an individual that offers futures market brokerage services. An IIB has to be a member of the National Futures Association (NFA), which is responsible for registration and general supervision, and it must be registered with the Commodity Futures Trading Commission (CFTC) to whose regulation it is subject. Furthermore, IIBs are subject to the regulation of the respective commodity exchanges.

An IIB takes customer orders and transmits them to any futures commission merchant (FCM) for handling. This means that, in contrast to a guaranteed introducing broker (GIB), an IIB's activities are not tied to a specific FCM. While an FCM is able to mitigate the counterparty risk by, for example, obligating the customer to pay and maintain a margin deposit, an IIB does not accept any collateral, regardless

whether it includes money, securities, or property. In contrast to a GIB whose operations are guaranteed by an FCM, an IIB has to take on responsibility for its operations. Therefore, an IIB has to raise its own capital to meet the minimum capital requirements that are determined by the CFTC and by the NFA. In addition, an IIB has to provide minimum financial reporting on a semiannual basis.

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Information Ratio

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The information ratio (IR) relates an investment manager's mean excess return to the risk that the manager has to bear in order to generate excess return. Since the IR builds on the Markowitz mean-variance paradigm, risk is expressed in terms of the excess return's volatility. The IR serves as an important key figure for performance analysis to assess the investment manager's skills. Two different versions of the IR are common practice, depending on how the excess return is calculated.

The excess return is expressed relative to a given benchmark index. Often, it is simply defined as the difference between the portfolio and the benchmark return, that is, $r_P(t) - r_B(t)$, and the volatility entering the definition of the IR is the volatility of $r_P(t) - r_B(t)$. Therefore,

$$\mathrm{IR} = \frac{\mu_P - \mu_B}{\sqrt{\sigma_P^2 + \sigma_B^2 - 2\rho_{PB}\sigma_P\sigma_B}} \qquad (1)$$

where μ_P is the mean return of the portfolio (with volatility σ_P), μ_B the mean return of the benchmark (with volatility σ_B), and ρ_{PB} the correlation between benchmark and portfolio returns.

As an alternative, we can also express the excess return adjusted by the benchmark exposure. For the definition of the benchmark, we resort to a CAPM- or APT-based model to take into account the systematic risk component. The portfolio returns are assumed to be generated by the linear model:

$$r_P(t) - r_f = \alpha + \beta(r_B(t) - r_f) + \varepsilon(t) \qquad (2)$$

where r_f is the constant risk-free rate and $\varepsilon(t)$ is a serially uncorrelated error term following a normal distribution with zero mean return and volatility σ_ε. The term

$$\beta = \frac{\rho_{PB}\sigma_P\sigma_B}{\sigma_B^2} \qquad (3)$$

measures the sensitivity of the portfolio return with respect to the benchmark, often a broad market index. The excess return is then given by

$$r_P(t) - r_f - \beta(r_B(t) - r_f) = \alpha + \varepsilon(t)$$

with mean α and volatility σ_ε. The IR is then equal to the ratio of α and σ_ε. To compare the differences of the IR defined in Equation 2, we first calculate the variance of portfolio return as

$$\sigma_P^2 = \beta\sigma_B^2 + \sigma_\varepsilon^2$$

Using Equation 3, we rewrite the residual volatility σ_ε that enters the IR calculation as

$$\sigma_\varepsilon = \sqrt{\left|\sigma_P^2 - \rho\sigma_P\sigma_B\right|}$$

Therefore, we get

$$\mathrm{IR} = \frac{\alpha}{\sigma_\varepsilon} = \frac{\mu_P - \beta\mu_B}{\sqrt{\left|\sigma_P^2 - \rho\sigma_P\sigma_B\right|}} \qquad (4)$$

The IR defined in Equation 4 can be above or below the IR defined in Equation 1. The advantage of specification 4 is that it explicitly takes into account the benchmark exposure of the investment manager's portfolio. Therefore, in a situation in which the investment manager has to decide on adding further assets to an already well-diversified portfolio, the IR defined in Equation 4 gives a better picture of the incremental performance contribution from the additional asset. If the current portfolio is not diversified, then the IR defined in Equation 1 is more appropriate.

Initial Public Offering

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An initial public offering (IPO, going public) is the first sale of a company's common shares to stock market investors on a publicly traded stock exchange. An IPO permits a corporation to access a broad pool of investors, thus providing it with capital for future growth. On going public, the company is quoted (listed) on a stock exchange. Listing imposes heavy reporting requirements and regulatory compliance. If the company later sells newly issued shares on the public stock exchange (again), this is then called a seasoned equity offering (SEO). The company offering its shares is known as the issuer.

The shares sold at the IPO can be either newly issued or existing shares. The money paid by investors for the newly issued shares goes directly to the company (in contrast to the sale of existing shares, where the money goes to the selling shareholders). In practice, some IPOs consist entirely of newly created equity, with the original shareholders retaining all their shares; some IPOs involve selling only existing shares, with no new funds being raised for the company, but with the original owners selling some of their holdings. Most IPOs consist of a combination of the two. The original investors will observe their shareholdings diluted as their percentage on the corporation decreases.

Hence, the two important functions of an IPO are providing finance to companies and providing an exit route for the original investors and entrepreneurs. Usually, certain shareholders (company executives, managers, employees, venture capitalists, etc.) agree to waive their right to sell (a part of or all) their existing shares for a certain predetermined time period following the offering (lockup).

IPOs usually involve one or more investment banks as underwriters who are responsible for selling the shares to the public. The syndicate of investment banks is presided by one or more major investment banks (lead underwriter). The sale (i.e., the allocation and pricing) of shares in an IPO may take numerous forms, the most important being firm commitment and best efforts method. Under a firm commitment deal, the underwriters commit to selling all the shares offered. If the

offer is higher than the demand, the underwriters are left with the unsold shares. In a best efforts offering, the underwriters make no commitment other than to sell as many shares as they can; if they sell less than what is offered, the issuer receives a lower amount of money. Upon selling the shares, the underwriter keeps a commission, which is usually based on a percentage of the value of the shares sold. The lead underwriters take the highest commissions—up to 8% in some cases. The issuer typically permits the underwriters an option of enlarging the size of the offering by up to 15% under certain circumstances (greenshoe or overallotment option). Historically, IPOs have been underpriced, both in the United States and globally.

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Institutional Buy Out

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An institutional buyout (IBO) refers to the takeover of a company by a financial institution. The institutional investor is usually a private equity, a venture capital company, or a segment of a commercial or investment bank. It could be also a mutual fund, an insurance company, a pension fund, or an endowment fund. In many cases, the institution acquires a majority stake and the incumbent management buys a small stake of the target company. However, the entire target company can also be taken over by the financial investor who then hires a group of managers to run the company. The institution buys the company either on the stock exchange (going-private buyout, public to private) or directly from the vendor. In many cases the financial buyers use a high percentage of debt financing in order to purchase a company (leveraged buyout [LBO]).

The main goal of the investor is to increase the profitability of the company, thus raising the market value. Core sources for improvement in the operating performance is a decrease in the capital expenditures (Kaplan, 1989), as well as management incentives and agency costs effects. By means of buyout specialists who structure the transactions, monitor and control the management teams, agency costs can be reduced and the operating income increased (Jensen, 1986, 1988).

The buyout firm seeks to harvest its gains within a 3–5 year time period by selling the company's shares. Among the most common exit strategies are the sale to a strategic buyer (trade sale), an initial public offering (IPO), or a sale to another financial institution (secondary purchase).

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Intangibles Company

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Intangibles companies have a business model that is primarily based on intangible assets. The company value lies in its ability to commercialize intangible assets and, thereby, convert intangibles into revenues. Tangible assets have a physical substance whereas intangible assets are not physically visible but nevertheless have the potential to generate commercial value. In case intangible assets are legally protected, they are called intellectual property. Patents, copyrights, and trademarks are important forms of intellectual property an intangibles company can own.

There are several different mechanisms for an intangibles company to extract value from its intangible assets. One alternative is internal commercialization to create a marketable product or service. The intangibles company then needs to own complementary tangible assets required for the commercialization process. Typical tangible assets required for commercialization are manufacturing and distribution facilities or a sales department. The intangibles company can cooperate with another company in a partnership to commercialize its intangibles. With this strategy, the involved partners are able to share the provision of complementary tangible assets required for commercialization.

Intangibles companies may also decide to follow external commercialization strategies for which they do not need to own complementary tangible assets. Intangibles companies can sell their intangible assets, usually in the form of intellectual property, to another company. Thereby, they generate one-time cash inflows. Alternatively, the intangibles company may choose a licensing strategy. The intangibles company then receives periodic royalty payments from the external licensee. In return, the licensee owns the right to commercialize the intellectual property.

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Intercommodity Spread

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An intercommodity spread involves simultaneous long and short positions in different but related commodity futures contracts with usually the same settlement date. It is to be distinguished from intracommodity or calendar spreads (combination of futures on the same underlying but different settlement dates) and interexchange spreads (combination of futures contracts on the same underlying, which are traded on different exchanges). Intercommodity spreads are mainly used for speculation by entering sophisticated economic positions in commodity markets. Examples are crack spreads and crush spreads. The name crack spread comes from the fact that oil needs to be "cracked" to produce refined products such as gasoline and heating oil. The investor takes a long position in crude oil futures

and a short position in refined products. Thus, the strategy profits from changes of the differences of futures prices. It synthetically creates the profit and loss situation of an oil refinery. Meanwhile, New York Mercantile Exchange (NYMEX) also offers options on crack spreads. Similar ideas apply to the crush spread: A trader takes a long position in soybean futures and a short position in soybean meal and oil futures. This position matches that of a soybean processing company. Intercommodity spreads are less seriously affected by shocks to the market as a whole than outright positions in a single futures contract. Therefore, they are sometimes perceived to be less risky. However, one has to keep in mind that the losses due to adverse changes of the price difference may be higher than single (outright) futures positions. Furthermore, margin requirements might be reduced due to the offsetting nature of the contracts.

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Interdelivery Spread

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An interdelivery spread—also known as intramarket, intracommodity, time, calendar, or horizontal spread—is a trading strategy that concurrently involves entering a long and short on the same futures contract but each would have different delivery months. As any spread strategy, this position is less risky than standard outright futures positions as the two futures will partially hedge each other. The aim of interdelivery spreads is to bet on the price difference of the two contracts. Depending on the concrete underlying investment, one anticipates that the price difference between both months either widens or narrows. For example, if a trader is long June corn and short August corn, then the trader anticipates that the price of June corn would increase and the price of August corn would decrease; therefore, the gamble is on the widening of a price difference. The two most famous types of interdelivery spreads are bull spreads and bear spreads. In a bull spread you long the nearer contract and short the more distant one. The strategy name is due to a universal rule for numerous storable commodities, such as corn and pork bellies. In a bull market, the near contract will increase over the distant months. In a bear spread you do the reverse, you sell the near future and offset it by purchasing a future with an extended delivery date.

Other examples of interdelivery spreads would be to go long on a crude oil futures contract with delivery next month and selling short on the same contract where delivery takes place in 6 months. Spread traders are merely interested that the long positions they hold increases in value against their short positions.

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Interest Rate Swap

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In any kind of swap, two parties pay a stream of cash flows to one another during a given period of time. In an interest rate swap (IRS), the cash flows are computed on the same notional but with different interest rates. The three main kinds of IRS are as follows:

1. Fixed against floating swap—at any settlement date, a party pays a fixed interest rate while the other party pays a floating interest rate on the same notional
2. Floating against floating swap—both parties pay a floating (but different) interest rate
3. Fixed against fixed swap—cannot be found on the market since it would create an advantage (and a disadvantage) only for one of the party and the other party wouldn't accordingly enter into the deal.

An example of a fixed against floating swap can be found in Table 1: on the notional of U.S. $240,000, party *A* pays (1-month) LIBOR at any month, while party *B* pays a fixed rate (3%). At any settlement date, only the party who has the higher debt actually pays something to the other party.

SETTLEMENT DATES

The settlement dates are usually the same for both parties. This could create some problems for a floating against floating swap on two different segments of the yield curve (basis swap). For instance, if the 1-month LIBOR is exchanged against the 3-month LIBOR, then one party should pay every month while the other should pay every 3 months. In order to avoid this date mismatching, the settlement dates are set to the longer period (3 months in the example) and the other party pays the compounded amount of what should have been paid at any shorter period (in the example the sum of the first 1-month payment compounded by 2 months, the second 1-month payment compounded by 1 month, and the third 1-month payment).

PRICING

When two parties enter into any swap, the expected present values (under the risk neutral probability) of their future payments

TABLE 1

Example of a Fixed against Floating Interest Rate Swap on the LIBOR

Time (In Months)	***A* Pays LIBOR (In %)**	***B* Pays Fixed Rate (In %)**	**Notional 240,000 USD**
1	3.5	3	*A* pays 100 USD to *B*
2	3	3	No payments
3	2.8	3	*B* pays 40 USD to *A*

must equate (Flavell, 2002; Pelsser, 2000). In other words, the net expected present value for both parties must be zero. Algebraically, if the two parties enter into the swap at time t_0 and the swap lasts till T, the following condition must hold:

$$0 = \mathsf{E}_{t_0}^{\mathrm{Q}}\left[\sum_{s=t_0}^{T}\frac{p_{\mathrm{A}}(s)-p_{\mathrm{B}}(s)}{(1+r(t_0,s))^{s-t_0}}\right] \qquad (1)$$

where $p_{\mathrm{A}}(s)$ is the payment made by party A at time s, $p_{\mathrm{B}}(s)$ is the payment made by party B at time s, $r(t_0, s)$ is the spot interest rate from time t_0 to time s, E is the expected value operator, and Q is the risk neutral probability.

Equality 1 must hold true only when the swap is entered into. Instead, for any time until the maturity (T), the (mark-to-market) value of the swap can be either positive or negative (and its absolute value is the same for both parties). In particular, at any time t, the value of the IRS for party B (who must pay p_{B} and receive p_{A}) is given by (see, for a basis framework, Bicksler and Chen, 1986)

$$\mathrm{IRS}_{\mathrm{B}}(t) = \mathsf{E}_t^{Q}\left[\sum_{s=t}^{T}\frac{p_{\mathrm{A}}(s)-p_{\mathrm{B}}(s)}{(1+r(t,s))^{s-t}}\right]$$

with $\mathrm{IRS}_{\mathrm{B}}(t) = -\mathrm{IRS}_{\mathrm{A}}(t)$.

In a fixed against floating swap, with constant p_{A} and floating $p_{\mathrm{B}}(s)$, which is independent of $r(t_0, s)$, Equation 1 simplifies to

$$p_{\mathrm{A}} = \frac{\sum_{s=t_0}^{T}\mathsf{E}_{t_0}^{Q}[p_{\mathrm{B}}(s)]B(t_0,s)}{\sum_{s=t_0}^{T}B(t_0,s)}$$

where $B(t_0, s)$ is the price in t_0 of a zero-coupon expiring in s. Accordingly, the fixed payment p_{A} must equate the weighted average of the expected payments $p_{\mathrm{B}}(s)$ where the weights are given by the zero-coupon expiring at the settlement dates.

WHO SHOULD BUY AND ISSUE INTEREST RATE SWAPS

Interest rate swaps can be issued either for speculative or for hedging purposes.

From a speculative point of view, if we intend to bet on the rise of interest rate, then we can enter into (or issue) a swap, whereby we pay a fixed interest rate while receiving a floating interest rate. On the other hand, if we want to bet on interest rates falling, then we can issue a swap where we pay a floating interest rate while we receive a fixed interest rate. Furthermore, when betting on the steepening of the yield curve, we enter into (or issue) a swap where we pay the short-run interest rate and receive the long-run interest rate and conversely, if we anticipate that the yield curve will become flatter.

From a hedging point of view, assume the case of a firm, which receives fixed interest rate on its assets while it pays floating interest rate on its liabilities. In order to reduce (or eliminate) the interest rate risk, this company can enter into a swap, where it pays fixed interest rate while it receives floating interest rate. The counterpart of a hedger can be either a speculator or another hedger bearing the opposite risk. In academic literature, it is suggested that, while the demand for fixed for floating swaps is enhanced, the demand for floating for fixed swaps is reduced by the presence of asymmetric information in firms' decisions (Titman, 1992).

TABLE 2

Notional Amounts Outstanding of IRSs (In Billions of USD)

	Dec 2004	Jun 2005	Dec 2005	Jun 2006	Dec 2006
Total OTC derivatives	257,894	281,493	297,670	369,507	415,183
IRSs	150,631	163,749	169,106	207,042	229,780
% of the total	58.41	58.17	56.81	56.03	55.34

Source: Bank for International Settlements (2006).

EXOTIC IRS

The most common derivatives on IRS are the following ones:

1. Forward IRS. By this contract two parties agree to enter an IRS at a given future date. This is also called delayed start swap or forward-forward swap.
2. Basis swap. This is a particular kind of floating against floating interest rate swap where the streams of variable payments are computed on the same notional but at different floating interest rates (called bases).
3. Amortizing swap. The notional of the swap is reduced through time (like in an amortizing plan).
4. Zero-coupon IRS. With respect to the IRS, nothing changes for the party who must pay the floating rate while the other party pays the fixed interest rate only at the maturity (like it happens for a zero-coupon).

MARKET SIZE

IRSs are the most common over-the-counter (OTC) derivatives traded in the international markets. In its semiannual OTC derivatives statistics at end of December 2006, the Bank for International Settlements (BIS, www.bis.org) published the figures given in Table 2.

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Internal Rate of Return (IRR)

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Performance measurement in illiquid investments, such as portfolio companies of private equity funds or M&A transactions in general, can be quite challenging. This is particularly true if there are no observable market prices for these investments during the investment period (Kaplan and Schoar, 2005). Furthermore, if cash flows are unequally spaced over time, common time weighted performance measures as

with traded stocks or normal mutual funds cannot be used.

It is often argued that the return on a private equity investment should be measured by using a value (or cash flow, or dollar) weighted return measure, that is, the internal rate of return (IRR). The IRR gives the discount rate that makes the present value of all cash flows equal to zero and can be expressed by

$$\sum_{t=0}^{T} \mathrm{CF}_t (1 + \mathrm{IRR})^{-t} = 0$$

where T is the lifetime of the fund (mostly measured in years) and CF_t is the cash flow accrued over period t. The investment's residual value (or net asset value [NAV] in the case of funds) is usually taken as a final cash inflow in year T. If one considers a portfolio of several investments, these investments' cash flows can be summed up to obtain CF_t from the above formula. This measure is sometimes referred to as "pooled" IRR. The solution to this equation can only be obtained by numerical approximation as there is no general algebraic solution to this higher-order polynomial for large values of T, that is, for long cash flow streams. The result is a percentage gain in value per year of the investment measured.

The rationale behind weighting by cash flows is the following: A value-weighted return is heavily influenced by the time pattern of cash flows on which its calculation is based, while a time weighted return is defined as being independent of this time pattern, since it is simply the geometric mean of the single period return realizations. If a fund manager is interested in assessing the performance of an open-end public market investment fund, he will not have control over time patterns of cash flows and his performance should be measured on the basis of a time weighted return. In fact, this is what is done in quoted mutual funds open to retail and institutional investors.

Things can be different, if one investigates a private equity fund. It could be argued that the general partner of such a fund has partial control over the time pattern of cash flows. If this is the case, his performance should be measured on the basis of a value-weighted return. However, the IRR method is not without limitations. Consider the example shown in Table 1 of two funds with cash flows and net asset values (NAV) as stated in Kaserer and Diller (2004).

The true asset return of both funds A and B for the respective period is assumed to be R_t. This return is usually unobservable. The NAVs are assumed to be unbiased and to reflect the market value of residual assets. Time weighted performance is 11.5% for both funds in this example. Using this return

TABLE 1

Cash Flows and NAVs of Two Funds

T	0	1	2	3
R_t		10%	20%	5%
(A) NAV_t		110.0	32.0	33.6
(A) CF_t	−100.0	0.0	100.0	33.6
(B) NAV_t		110.0	60.0	63.0
(B) CF_t	−100.0	60.0	0.0	63.0

Note: Cash outflows are marked with a minus sign.

measure, both fund managers would be attributed the same performance. However, due to the different time pattern of cash flows, the IRR differs. Specifically, fund A has an IRR of 13.8%, while it is equal to 11.1% for fund B. The question is, does it make sense to say that the manager of fund A has performed better than the manager of fund B?

Even if an investment has a higher IRR than a second one, it cannot generally be inferred that the first one is the better one. This is because the IRR method assumes that cash flows generated by the fund can be reinvested at an interest rate equal to the IRR. This is not feasible in most cases. First, it is usually not possible for the investor to invest distributions during the investment project's lifetime in an alternative project with an identical rate of return. Second, it would lead to different reinvestment rates for cash flows accruing at the same time. If the investor would have to invest cash distributions from the fund into more realistic alternatives such as other stocks or bonds, it could happen that the ranking of two investment alternatives in terms of their present value of cash flows is different depending on the reinvestment rates.

A solution to this rank order problem is the modified internal rate of return (MIRR), which is given as

$$\text{MIRR} = \sqrt[T]{\frac{\sum_{t=0}^{T} CF_t^{+}(1+r)^{T-t}}{\sum_{t=0}^{T} CF_t^{-}(1+r)^{-t}}} - 1$$

where CF^{+} are cash outflows from the fund (positive cash flows for the fund investor), which are compounded to the end of the investment period and CF^{-} are cash inflows, which are discounted to the beginning of the investment. The rate at which cash flows can be invested alternatively is r. Return rates derived with this measure can be compared to the extent that the underlying investments are of the same size in terms of net present value of cash outflows (denominator of this formula) and the length of their investment period is the same. For a more recent measure, which uses alternative reinvestment rates, see public market equivalent (PME).

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In-the-Money Options

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An in-the-money (ITM) option is either a call option where the asset price is greater than the strike price or a put option where the asset price is less than the strike price. An ITM option is one that would lead to a positive cash flow, if it were exercised immediately. ITM options are less popular than their out-of-the-money counterparts. In particular, they are considered as expensive, which reflects the fact that their intrinsic value, that is, the payoff that would be received if the underlying would be at its current level when the option expires, is nonzero. The buyer of an option that is in-the-money is expecting that the price will increase above the current spot price if it is a call or that the price will decline below the current spot price if it is a put.

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Intrinsic Value

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Intrinsic value (IV) of an option is part of an option's premium paid by the option's buyer to the option's seller. The premium paid by the buyer to the seller of an option can be decomposed into two components: the intrinsic value and the time value. The intrinsic value of a call option (C) at time t is given by

$$\mathrm{IV}_{C,t} = \mathrm{Max}[0; S_t - K] \qquad (1)$$

where S_t represents the underlying asset price at time t and K stands for the exercise price of the option.

The intrinsic value of a put option (P) at time t is given by

$$\mathrm{IV}_{P,t} = \mathrm{Max}[0; K - S_t] \qquad (2)$$

In-the-money options have a positive IV while for options at-the-money or out-of-the-money the intrinsic value is zero.

At maturity (T), the value of an option equals its IV_T, that is

for call options, at maturity (C_T)

$$C_T = \mathrm{IV}_{C,T} = \mathrm{Max}[0; S_T - K]$$

for put options at maturity (P_T)

$$P_T = \mathrm{IV}_{P,T} = \mathrm{Max}[0; K - S_T]$$

Starting by American options (that can be exercised at any moment in time until maturity), its intrinsic value, estimated at any moment in time (t), can be seen as the amount that the buyer would recover if the option was exercised earlier at time t. As American options can be exercised at any moment in time, the premium paid by the option buyer to the option seller can never be lower than its intrinsic value. Otherwise, the option buyer would exercise the option immediately after buying it, locking in an immediate profit. By opposition, the option seller would accommodate an immediate loss, and therefore, there would be no rational option sellers in the market. Therefore, it is unreasonable to accept that the intrinsic value could ever be negative for American options.

For European options, however, particularly for deep in-the-money put options, or for calls just prior to the underlying stock paying dividends or yielding other cash inflows, it is conceivable that option premiums can be lower than their corresponding intrinsic values.

> Example: IBM shares are presently trading at \$113.37. American call and put options with maturity within 60 days are trading for several strike prices. Quotes for calls and puts follow: K = \$110, C = \$6.10, P = \$2.60; K = \$115, C = \$3.10, P = \$4.70.

The intrinsic value for each series, applying Equations 1 and 2, is as follows:

Strike	Calls (\$)	Puts (\$)
K = \$110	3.37	0.00
K = \$115	0.00	1.63

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Introducing Broker

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There are various brokers who may be involved in the investment process of an investor who chooses to trade futures contracts. An introducing broker (IB) may assist in the education of investors in futures trading and futures markets, and may actively solicit traders for new and existing accounts. Introducing brokers may provide trading and quote information, and even accept orders from traders. However, all funds, credit, margin, and positions are held with another entity, a registered futures commission merchant (FCM), who is independent of the introducing broker. Even though the FCM and the IB are independent, they may charge the trader a commission and split the proceeds. While the IB can solicit and accept orders, all clearing and settlement functions must be executed by the FCM.

An independent IB is required to register with the Commodity Futures Trading Commission (CFTC) and maintain a minimum net capital as required by the CFTC. Introducing brokers are also subject to the oversight of the National Futures Association (NFA). The IB is allowed to execute trades with any FCM they choose. A guaranteed IB is not required to maintain a minimum net capital position, as their requirement is guaranteed by an affiliated FCM, who is ultimately responsible for the regulatory and financial responsibilities of the independent broker. A guaranteed IB must execute all trades and hold all assets of the client at only one FCM, who is the guaranteeing FCM.

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Investable Hedge Fund Indexes

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Investable hedge fund indices are portfolios that aim to provide the performance of hedge funds indices. They advocate a more transparent alternative to fund of hedge funds (FoFs), since they use a rules-based selection methodology that is common in the construction of more traditional financial indices. Rules-based selection criteria are usually based on size of the funds, whether they are open to investment and certain liquidity conditions. The criteria do not necessarily provide benchmark indices that are representative of the broad hedge fund market or of a certain sector index. Hedge fund investing holds a large number of heterogeneous products and dynamic and nontransparent investment strategies. Hedge fund indices are also calculated using databases that are polluted by several biases, including selection bias and survivorship bias. Successful hedge funds have often not been included in investable indices, because they are usually closed for investments and do not need additional efforts to attract investors. The question whether hedge funds indices are representative benchmarks is still open. The first investable hedge fund index was launched in 2002 by BNP Paribas in partnership

with Standard & Poor's, which granted them a license to deliver products linked to the S&P Hedge Fund Index. BNP Paribas offered a number of derivative products, such as principal protected notes, swaps, and options linked to the hedge fund index. It was the first opportunity to have the same type of exposure as hedge funds with daily liquidity and higher level of transparency. The index provider discloses information about the hedge funds composing the index and it has access to performance information, operational structure, and risk exposure. Index sponsors often perform ongoing due diligence and require auditors to access funds' performance.

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IPO Action Track

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An IPO action track is a proprietary trading model of the IPO Financial Network Corporation (IPOfn) that gives short-term recommendations on initial public offerings (IPO). The only companies taken into account are those which have gone public within the last 6 months, and whose IPOs were accomplished by the top 5% of the underwriters. By paying a subscription rate, the customer receives daily faxed reports containing, for instance, new buy and sell signals, triggered buy and sell signals and canceled buy and sell signals, average volume, IPO size and volume factors, and analyst recommendations (see http://www.ipofinancial.com/faxpak.htm, retrieved July 18, 2007). The trading model takes no fundamental information into consideration. Fundamental information would include, for instance, income statement data such as earnings, balance sheet data such as book value of asset and liabilities, and cash flow statement data such as cash flows from operating activities, if available in the case of an IPO. The basic methodology used for the IPO action track is called technical analysis, in contrast to the fundamental analysis that applies fundamental information. Technical analysis studies past financial market data and identifies nonrandom price patterns to forecast price trends (Kirkpatrick and Dahlquist, 2006). Thus, the technically based program of the IPOfn corporation only requires price activities of the considered stocks and attempts to identify short-term trends (see http://www.ipofinancial.com/institut.htm, retrieved July 18, 2007). IPOfn also offers faxed reports for secondaries referred to as secondary action track.

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IPO Price

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This is the share price established when a company is initially listed on a stock exchange and shares become tradable in negotiations. Of all the puzzles in corporate finance, the process of price setting for an IPO is one of the most difficult to solve and still has no solution. In any event, the method used to quantify and analyze the value of a share must focus on the efficiency of price to see whether all the available information were actually incorporated (Benveniste and Spindt, 1989).

The information asymmetry that exists between investors and the company being listed and the financial intermediary is the most relevant variable in setting a price. In fact, one of the characteristic features of venture-backed IPOs is a certain degree of underpricing. In particular, firms whose value is highly unsure are likely to have higher initial returns. In other words, underwriters tend to compensate investors for the higher costs of learning about such firms, which are more difficult to analyze (Ljungqvist and Wilhelm, 2001).

In recent years, running alongside the study of the causes of underpricing, a new research stream has surfaced with the aim of revealing whether public information is incorporated into the pricing of an IPO (Lowry and Schwert, 2003). The ultimate goal is to determine whether the existing price can be deemed economically efficient, notwithstanding later movements. In other words, can the price take into account all knowable market data, *a priori*? If so, differences that may emerge between the IPO price and the stock market price can be explained by means of a "manipulated" use of information. Though findings indicate that public information is somewhat incorporated into the offer price, the effect of this information on initial returns is rather small in economic terms. The reason for this, in part, is that any of the parties involved in the deal can easily acquire the data, and cannot significantly impact the share price. Consequently, one can affirm that beyond the underlying characteristics of the company, the IPO price also depends on the ability of the intermediary to slot all the information into the assessment process that investors expect to be actually considered. This serves to diminish the information asymmetry that exists between the parties involved in the listing.

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IPO Sentiment Index

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Empirical studies show that IPO markets are highly cyclical: hot issue phases are followed by periods with modest IPO activity. There are two main strands of theory explaining the decision of a company to go public.

While life cycle theories argue for an optimal point of time in the company life cycle to go public, market-timing theories stress the importance of capital market conditions for the timing of IPOs (for a survey cf. Ritter and Welch, 2002). If market timing is important, the IPO climate is an important parameter for the success of an IPO that should be monitored continuously. The IPO sentiment index is such an innovative instrument to predict the climate for IPOs in Germany. It was introduced by the German stock exchange (the Deutsche Börse Group) in January 2006 and is calculated quarterly by the Center for Entrepreneurial and Financial Studies (CEFS) at Technische Universität München.

In comparison to other IPO climate indices, which are mainly based on a survey of market participants to observe their expert judgment, it additionally reflects the observed underpricing of the past. Since empirical studies find a correlation between the level of underpricing and subsequent IPO activity (Lowry and Schwert, 2002), there is a good reason to include the observed underpricing in the prediction of IPO activity. In its calculation, the IPO sentiment index (ISI) is calculated by multiplying the underpricing sentiment (USI) with the IPO climate (for further details in the calculation of the IPO sentiment index cf. Kaserer, 2006):

$$\text{ISI} = \frac{\text{USI} \times \text{IPO climate}}{100}$$

The USI considers the historical observed underpricing (the underpricing sentiment) in the last eight quarters. Based on prospect theory (Kahneman and Tversky, 1979), investors assess realized losses much stronger than realized profits. Therefore, negative underpricing is weighted one and a half of positive underpricing. The second component, the IPO climate is based on a survey of market participants (banks, institutional investors, and venture capital/private equity firms) consisting of five questions (about the attractiveness of the current IPO market, current valuation level, and future IPO activity). In its first year, the IPO sentiment index showed a good prediction capacity for future IPO activity in Germany. The historical development is regularly published on the webpage of the *Deutsche Börse Group*.

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IPOX *(Initial Public Offering Index)*

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The global range of IPOX® Indexes provides a transparent, highly liquid, and scaleable benchmark for the performance of the global IPO and spin-off sectors with the potential for risk-adjusted outperformance to conventional large- and mid-cap exposure in equities worldwide. The 'going public' event has effects on corporations, which are truly unique and

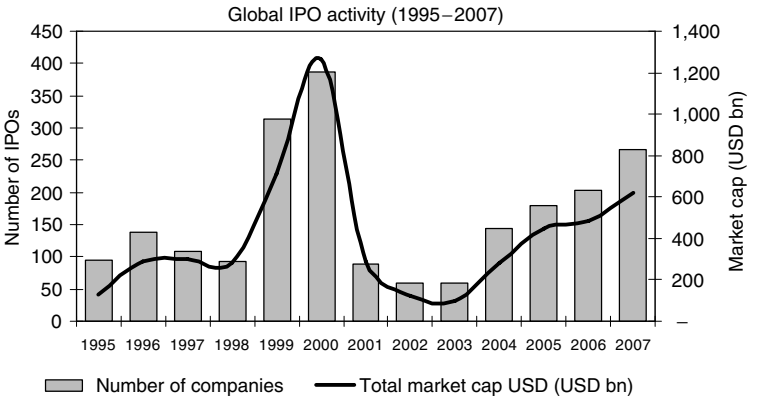

FIGURE 1
Global IPO activity (1995–2007). (IPOX Schuster LLC. www.ipoxschuster.com)

long-run in nature. It is also difficult to value newly listed companies because of the high level of information asymmetry at the IPO date. This is due to institutional constraints (short selling restrictions, no historical beta, quiet period, and limited analyst coverage). As companies progress, once being listed, this information asymmetry works itself out in share price movements. These underlying dynamics result in a large dispersion in long-run IPO returns (over time many IPO companies will eventually have underperformed and relatively few companies will have overperformed). Exposure into the few overperforming companies, however, can produce substantial asset allocation benefits. IPOX provides an index methodology that seeks to unlock these asset allocation benefits. An underlying force affecting the IPO markets has also been accounting reforms under Sarbanes-Oxley ("SOX"). This has resulted in higher quality of disclosure, which also means greater company transparency, an important factor especially for IPO companies. The global IPO and spin-off market is economically significant and represents the lifeblood of equity capital markets (ECM) activity. Since 1995, an average of U.S. $500 billion per annum in market cap has been created through IPO and spin-off activity globally (Figure 1). IPOs and spin-offs represent one of the most dynamically performing equity classes and offer a unique way for portfolio enhancement if tracked separately.

The IPOX Global Composite Index serves as a semipassive benchmark for the performance of IPOs and spin-offs globally. It is a fully market cap–weighted index that is dynamically rebalanced and is constructed and managed to provide a broad and objective view of global aftermarket performance of IPOs and spin-offs during the first 1000 trading days. With an average market capitalization exceeding U.S. $3 trillion, the IPOX Global Composite Index does not target a specific number of securities and sectors and the number of constituents is time varying. The respective subindexes, such as the IPOX-30 Global (all markets) Index, the IPOX-30 U.S. Index, the IPOX-30 Europe Index, the IPOX-30 Asia-Pacific Index, or the IPOX China 20 Index, pool the most liquid, largest, and typically best performing companies ranked quarterly in the underlying IPOX Global Composite Index. To ensure diversification, the maximum weighting of

constituents in the IPOX subindexes maximum weights is capped at 10% on the quarterly rebalancing date. Because of the exposure into the largest IPOs and spin-offs, the IPOX subindexes represent between 35 and 70% of all market capitalization created through IPO and spin-off activity in the underlying world region. The quarterly rotation and rebalancing allows for early coverage of the new growth segments and replacement of underperforming stocks, which has historically provided for positive risk-adjusted returns versus benchmarks.

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J

Jensen Alpha

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The Jensen (1968) alpha is a measure of absolute return realized by a portfolio manager. At the basic level, the alpha of Jensen is computed using the equation of the market model: $R_{it} - R_{ft} = \alpha + \beta[R_{mt} - R_{ft}] + \varepsilon_t$, where $R_{it} - R_{ft}$ denotes the excess return of a portfolio, $R_{mt} - R_{ft}$ denotes the excess return of a market portfolio or the market risk premium, and ε_t denotes the innovation. Based on the works of Racicot and Dagenais (1993), Racicot (2003) demonstrated that the market model may be extended to account for specification errors. This work was also published in Racicot and Théoret (2004) and a new alpha emerged. This model may be written as: $R_{it} - R_{ft} = \alpha + \beta[R_{mt} - R_{ft}] + \beta_2\, \hat{w}_{it} + \varepsilon_t$, where $\hat{w}_{it}$ are the residuals resulting from the regression of the market risk premium on the Dagenais' instruments. Racicot and Théoret (2008) showed that this method is equivalent to a GMM-C and HAUS-C—these acronyms being a GMM or a Hausman artificial regression using the cumulants (Dagenais' instruments) as instruments. The alpha may also be conditional. In that case, it is equal to $E(\alpha_t|I_{t-1}) = \alpha_0 + \varphi I_{t-1}$, where I_{t-1} stands for economic or financial variables explaining the alpha. Let us notice that a significant positive alpha is often associated with market inefficiencies. The conditional alpha was introduced precisely to show that it was the unconditional alpha; α_0 in the preceding equation is 0 when there are no market inefficiencies. Recent controversies exist in the financial literature because the alpha of the hedge fund strategies seems to be chronically significantly positive. Many solutions have been proposed to reconcile this observation with the criterion of market efficiency. One of these is panel estimation of hedge fund strategies by Racicot and Théoret (2007).

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Jones Model

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In the empirical literature, various attempts have been made to assess the likelihood or extent of earnings management. The statistical procedures that have been put forward can be classified into cash flow management models, for example, the detection of discretionary R&D or advertising outlays, accruals models, and combined approaches, for example, distributional tests and rankings (see Goncharov, 2005, for an overview). The Jones Model, proposed by Jennifer J. Jones (1991), falls in the category of accruals models and builds on and extends previous work by Healy (1985), DeAngelo (1986), and McNichols and Wilson (1988). All these studies jointly test a model of discretionary accruals and the existence of earnings management. In her paper, Jones addresses the question whether firms that are subject to import relief investigations by the U.S. International Trade Commission (ITC) manage their accruals to show lower earnings figures. Even though the firms under scrutiny would benefit from managing earnings and performance downward, the ITC traditionally did, unlike other addressees of financial reports, neither address nor adjust for such behavior. The study thus uses a unique research setting in which clear earnings management incentives prevail. The basic idea of the model applied for analysis is that the accrual component of earnings, that is, total accruals, can be understood as being composed both of nondiscretionary and discretionary accruals where the latter proxy for the extent of earnings. Both accrual components are not directly observable from financial statements. Following Healy (1985) nondiscretionary accruals can be understood as accounting adjustments to the firm's cash flows authorized by the accounting standard-setting organizations while discretionary accruals are adjustments to cash flows opportunistically chosen by the manager "from an opportunity set of generally accepted procedures defined by accounting standard-setting bodies" (p. 89). The Jones Model provides a structure for empirically estimating both components of total accruals. Total accruals, the dependent variable, are measured as changes in noncash current assets less nonfinancial current liabilities minus depreciation and amortization expense. The independent variables are intended to pick up the major drivers of nondiscretionary accruals resulting in the error term grasping the discretionary accrual component. According to this structure, Jones argues that changes in revenues should be included in the model as an independent variable to control for a firm's economic environment as they are, even though not being completely exogenous, a measure for the firm's operations before managers' manipulations. Likewise,

a variable measuring gross property, plant and equipment, is included to control for nondiscretionary depreciation expenses. All variables in the model are scaled by lagged total assets for statistical reasons and the model is finally estimated using an ordinary least square approach. Compared to previous models, the main advantages of the Jones Model are that it (1) is more sophisticated than simple models in which discretionary accruals are supposed to equal total accruals; (2) considers total accruals, that is, a comprehensive measure, instead of a single accrual component to detect earnings management behavior; and (3) neither supposes nondiscretionary accruals to be equal over time nor to have a mean of zero in the estimation period (therefore, the intercept is dropped in the estimation procedure). Hence, the Jones Model allows the nondiscretionary and the discretionary parts of accruals to vary with the economic circumstances a firm faces in each reporting period. However, the Jones Model has also been criticized for various reasons. For example, it was argued that the model does not capture earnings management related to the revenue recognition process. Moreover, it is said to overestimate the level of discretionary accruals within periods of extreme financial performance. These kinds of problems have led to modifications of the original Jones Model, where the most prominent is the so-called Modified Jones Model, which was proposed by Dechow et al. (1995). Due to the problems of accruals models in detecting earnings management in general, distributional tests and rankings have more often been used in recent research, particularly in cross-country studies (see Leuz et al., 2003).

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K

Kurtosis

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Kurtosis is the fourth centralized moment of a probability density function. It is meant to capture the flatness of a distribution. Hence, a small kurtosis implies a distribution that is concentrated around a small range of values of the underlying random variable, while a large kurtosis corresponds to a distribution that is very flat and spread out. Since the normal distribution has a kurtosis of 3, some analysts prefer to use excess kurtosis, which is defined as kurtosis minus 3 and measures the kurtosis of a particular distribution in excess of that for the normal distribution (Kendall et al., 1998).

Many option pricing models, such as the Black-Scholes model, assume that asset prices are normally distributed. In practice, this assumption is rarely met and asset prices have distributions with kurtosis higher than the normal distribution, which has important ramifications for option pricing. Black-Scholes implied volatilities often exhibit a "smile" when plotted against strike price. It has been suggested that one possible explanation for the smile is asset prices that have greater kurtosis than the normal distribution allows (Dumas et al., 1998).

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L

Large Order Execution Procedures

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The large order execution procedure is a rule that was established at the Chicago Mercantile Exchange and was developed especially for the trade of large orders. This rule or procedure allows a member of a contract market to execute simultaneously selling and buying orders of different principals (see CFR). The execution takes place directly between the principals. For example, an initiating party sets up a large order and a member of the contract market realizes the order in the pit. He then has to find a counterparty to fulfill the order. This is not a simple task because of the order size. For this reason both parties define a maximum quantity that is traded and an execution price that is intended. After this arrangement the quantity of the initiating party is transferred in the pit for trading. Bids and offers that are up to the intended execution price are accepted. After trading there might be some unexecuted quantity. This part is traded between the counterparty that was found before trading in the pit and the initiating party. The intended execution price serves as the basis for this trading. Large order execution procedures are often abbreviated by LOX. These procedures can be found in the most trading systems.

REFERENCE

Legal text: United States (CFR). Code of Federal Regulations, 17CFR, 1.39.

Last Notice Day

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The last possible day to give the exchange due notice of intention to deliver the underlying asset of a futures contract is termed last notice day (Hull, 2006). A commodities futures contract is not based on a fixed delivery date but on a

delivery period that usually spans the whole contract month. Hence the day of delivery notice may be chosen by the holder of the short position. The last opportunity to do so, that is, the last notice day, is generally a few days after the last trading day and 1–7 days before the last business day of the delivery month. The dates vary according to the exchange and the underlying asset. For instance, at the Chicago Board of Trade the last notice day "shall be the business day prior to the last business day of the delivery month." It generally takes 2 or 3 days from the issuing of notices of intent to deliver to the delivery itself. Usually, the exchange acts according to the rule of assigning notice of intention to deliver to the party with the oldest outstanding long position. Investors who are not willing to take delivery should close out their positions before first notice day (for further details see entry first notice day in this encyclopedia), as delivery must be met if notice of intention to deliver is given to the exchange.

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Last Trading Day

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Typically associated with a futures contract, it is the last day a trader can liquidate his/her position in a contract or take possession of the commodity. For example, if a bread company enters into a futures contract, in wheat with a December expiration date, the contract will expire on the third Friday of December. At that time, the bread company must either cancel the contract, by taking an offsetting position, or agree to take possession of the quantity of wheat in this contract. Given that most futures and options contracts expire on the third Friday of the expiration month, these extremely busy days are known as triple-witching days on Wall Street. After this date, trading of this particular contract stops; however, trading in other contracts continues until their expiration date.

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Lead Investor

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Each round of venture capital funding has a lead investor who negotiates the terms of the deal and usually commits to at least 50% of the round. Round of funding is the stage of financing a company is in. The usual progression is from startup to first round to mezzanine to pre-IPO.

Inside the venture capital syndicate, each investor is assigned with different roles. Typically, in order to achieve the satisfaction of syndication objectives, firms may adopt a series of techniques to realize the cooperation among investors. According to Wright and Lockett's (2003) review, shared equity ownership can promote the acquisition of information and enhance the mutual trust

levels at the cost of coordination problems while an imbalanced ownership may lead to an efficient decision making.

Although the distribution of equity stakes (shared equity ownership or imbalance in ownership) is remaining as a controversial issue, the lead investor still prefers to occupy a larger stake than nonlead syndicate members. The reason is the lead investor seeks more compensation due to its responsibility of promoting the coordination in the syndication. The equity stake also can be treated as an indication that distinguishes the contributions involved in venture capital funding for each member (Das and Teng 1998).

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Lead Manager

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This is the institution, typically an investment bank or its venture capital arm, that takes the role of organizing a round of venture capital funding. The lead manager typically finds other lending organizations or investors to create a syndicate, negotiate the terms with the company to be funded, and assess market conditions. In this case, the lead manager is also named syndicate manager, managing underwriter, or lead underwriter.

Typically, lead managers promote the stability of the share price once post-IPO trading starts. With the price manipulation permission from SEC, they might take a series of activities (e.g., post-IPO purchasing of shares) against the aftermarket bearish selling pressure (Ritter and Welch, 2002).

Some literature also focuses on the profitability of lead manager's market making behavior. Since lead managers are at an advantage in collecting information and placing shares, they can beat other investors acting as market maker (Ellis et al., 2000). Ellis et al. (2002) document that in Nasdaq because of the profitability of such activities, this making behavior in which the lead manager engages can last for a long time during the post-IPO period. It is opposite toward the situation in terms of the smaller IPOs. In that case, lead manager's making behavior ends shortly after the IPO.

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Lead Underwriter

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Underwriters are investment firms that act as intermediaries between companies

issuing securities and the purchasers of such securities among the general investing public. Underwriters, in general, oversee the valuation, marketing, and legal aspects of the offering. Moreover, in a firm commitment (underwritten) offering the underwriter guarantees the sale of a specified number of shares at a designated offer price, thereby guaranteeing the issuing firm a set level of proceeds. As such, the risk of sale is transferred from the issuer to the underwriter.

To reduce the risk borne by a single investment firm, a syndicate of underwriters is typically formed—the size of which is highly correlated to the anticipated level of offering proceeds. The head of the syndicate is the lead underwriter and is the entity that retains primary responsibility for the legal and administrative aspects of the offering. Syndicate members principally act as an additional layer of intermediaries for distributing the issue to the public.

Since the lead underwriter maintains control and possesses the greatest level of responsibility, its reputation is highly important in determining the acceptance of the issue by the public. For example, the reputation of the lead underwriter represents a certification signal that may be used by potential investors to judge the quality of the issuing firm.

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Leverage

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Leverage denotes any technique aiming at increasing the size of assets under control, either directly (i.e., buying more assets) or indirectly (buying financial assets that ensure a partial participation in the underlying asset's price development), without increasing the initial amount of the capital invested (Miller, 1991). In other words, leverage is any financial mechanism used to increase the potential return per unit of amount invested, by magnifying the risk exposure at the same time (Schneeweis et al., 2005).

Leverage comes in three main forms. Traditionally, leverage is understood as the use of borrowed funds to increase the size of assets under control. Beyond traditional leverage, economic leverage is also widely used. Economic leverage denotes the inclusion of assets with internal leverage in the portfolio (instrument leverage). Since these assets are notionally funded, it is possible to control a larger amount of the underlying position with a small initial investment/margin. Beyond these, using a third form of leverage, which is referred to as "construction leverage," is also observable (Horwitz, 2004). This term refers to the practice of combining certain long and short positions of assets with preferably high correlation, thus eliminating market risk (at least in part). By using this methodology, fund managers are targeting idiosyncratic risk with a relatively small initial investment.

Measuring the degree of leverage is not an easy task. As for the traditional form

of leverage, it measures the ratio between interest bearing debt and equity within the balance sheet. The effect of paying fixed debt costs will magnify the volatility of the (after-tax) earnings per unit of capital invested—this is also known as leverage effect. Certainly, the use of borrowed funds is, as a rule, efficient if the gains are higher than the fixed costs of borrowing.

As for economic and construction leverage, the degree of leverage characterizes the ratio between the size of (or investment in) the initial position and the total value of the underlying controlled through this position. The leverage effect denotes in this case that, when investing in such assets, changes in the market value of the underlying position might lead to disproportional changes in the value of the derivative position.

Note that leverage generates return distributions with inherent non-normality. This is so since by using leverage the underlying return distribution will be capped and part of this risk is transferred to other market participants (debt holders, option writers, etc.), thus creating an option-like characteristic in every case (Merton, 1974).

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Leveraged Buyouts

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A leveraged buyout (LBO), also known as a highly leveraged transaction (HLT), is a financial transaction where a firm's assets are acquired using a high level of debt. This results in a very high leverage for the firm after the transaction. Using a sample of 76 management buyout (MBO) transactions—a special case of an LBO undertaken by a firm's management—Kaplan (1989) reports that the book value of debt to equity ratio increased from 21% before the buyout to 86% after the transaction.

LBOs along with venture capital investments are the two primary investment vehicles for private equity funds. Using a sample of 746 private equity funds that are largely liquidated, Kaplan and Schoar (2005) report that about 41% of the private equity capital was invested in these funds. The mean size of an LBO fund in their sample is about U.S. $416 million.

To compare the performance of the LBO funds, the authors discount the cash flows for these funds with the return on S&P 500 index. Net of fees and on equal-weighted basis, the median LBO fund underperformed S&P 500 by a factor of 0.80 while the fund at the 75th percentile outperformed the index by a factor of 1.13. On value-weighted basis, where value is proxied by the amount of capital committed to the fund, the respective performance numbers are 0.83 and 1.03. They also find evidence of persistent performance.

Given LBO specialists such as KKR closely monitor a portfolio of firms after these transactions, LBOs should be thought of as a new form of organization similar in structure to that of a diversified conglomerate, according to Jensen (1989). Kaplan (1991), however, argues that LBOs are neither permanent nor short-lived organization form. This conclusion is based on his observation that the median firm in a sample of 183 large LBO transactions between 1979 and 1986 remained private for 6.8 years after the transaction (Kaplan, 1991).

But why do LBOs exist? Theoretically, in a Modigliani–Miller (1958) ideal world where taxes, transaction cost, and agency problems do not exist, capital structure is irrelevant and LBOs do not add any value. In reality, however, the tax shield of debt is valuable to a firm's equity holders. Hence, LBOs are expected to increase firm value. A counterargument is presented in Miller (1977) where an investor holds both debt and equity, and any benefit from the tax deduction for the equity gets completely offset by the tax paid on the interest income from the debt. Empirically, Kaplan (1989) provides evidence that value of the tax shield in a sample of MBOs between 1979 and 1985 ranged from 21 to 143% of the premium paid to pre-buyout shareholders.

A second source of value in an LBO may come from the reduced agency problem of the free cash flow. Free cash flow is the cash flow in excess of what is required to finance all the positive NPV project opportunities for a firm. Jensen and Meckling (1976) suggest that agency problem arises when a firm's manager is not a 100% owner of the equity, he/she has incentives to invest in negative NPV projects, including consumption of excessive perks. This happens because the manager accrues 100% of the benefit from such wasteful expenditures but bears less than 100% of the cost.

Jensen (1986) argues that LBOs can mitigate the agency problem of free cash flow. Increasing a firm's leverage increases managerial equity ownership. This assumes that the manager does not sell his/her equity interest at the LBO. This provides the manager with powerful incentives to improve the operating performance of the firm and reduce investments in negative NPV projects. In addition, with the interest payment of debt hanging over the manager's head as a sword and close monitoring by the buyout specialist, he/she becomes disciplined and does not have the opportunity to waste resources.

A third source of value in LBOs could be from the strategic sale of a firm's underperforming asset after the transaction. Strategic buyers can use these assets more efficiently and hence may be willing to pay a premium. Kaplan (1991) documents that about one-third of a firm's assets are sold to strategic buyers following an LBO and argues that this is much lower compared to 72% of the asset sale in case of a hostile takeover.

Critiques of LBOs may argue that such transactions transfer wealth from a firm's employees to its equity holders. Improved operating performance may come from the reduced wages and benefits of the employees who have little equity ownership and hence stand to gain little from such transactions. Based on empirical evidence, Kaplan (1989) concludes that the gain from the buyouts comes from better alignment of managerial incentive to those of the shareholders and from the reduced agency cost rather than wealth transfer from the employees.

Another critique against LBOs may be that such transactions transfer wealth from pre-LBO debt holders to equity holders. Increasing leverage also increases the probability of a bankruptcy. As the new debt used to finance an LBO is often senior to the preexisting debt, original bondholders are likely to recover less in case of a bankruptcy. Thus the original bondholders bear most of the increased cost of financial distress brought on by the LBO but almost none of its gains such as the benefit of the tax shield or the reduced agency cost. LBOs may also create an asset substitution problem where a firm has to forego positive NPV projects because it is unable to finance those projects due to a high level of debt.

The evidence is mixed on whether a firm's cost of financial distress increases after an LBO. Andrade and Kaplan (1998) examine 31 LBOs that became financially distressed subsequent to the transaction. They provide evidence that although some firms are forced to reduce capital expenditure and a few engage in asset fire sale, these firms still had superior operating performance than the median firm in the industry. In addition, they argue that the leveraged transaction generated a positive, albeit small, value even after subtracting the cost of financial distress. They did not find any evidence of asset substitution in their sample.

In contrast to these results, Zingales (1998) finds that highly leveraged firms have lower ability to make capital investments. Using data from trucking industry he finds that this was particularly pronounced in firms that were eventually forced to exit the industry.

Following a buyout, a firm may also face predatory threat from its deeper pocket competitors that do not have a high level of debt or interest payment. In the same study, Zingales analyzes the effect of high leverage on a firm's ability to react to and survive competitive pressures in the product market following deregulation. The author found that transportation firms with high leverage were forced to charge lower prices during the price war. In the end, the more efficient firms with superior operating performance were forced to exit partly due to high leverage, leaving the playing field for their inefficient, underleveraged, and deep-pocket competitors.

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Licensed Warehouse

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A licensed warehouse is a warehouse approved by an exchange from which a commodity may be delivered under a futures contract. A regular warehouse must satisfy exchange requirements for financing, facilities, capacity, and location and has been approved as acceptable for delivery of commodities against futures contracts. Indeed, exchange-traded commodities, such as energy commodities, are traded in specific lots of specific quality for specific delivery and usually also trade in forward, futures, and options contracts. The warehouse must verify that the products delivered in their walls are conforming to the contract specifications. Furthermore, only 2% of the transacted commodity futures contracts give way to delivery.

Investors, generally, close their contracts before expiration so that they do not have to take delivery of enormous quantities of commodities for which they have no storing space and no need. Therefore, as the delivery date nears, most investors close out their positions by undertaking an equal and opposite trade.

A warehouse operator cannot issue a warehouse receipt unless that person holds a warehouse license issued by an accredited organism. All delivery of commodities must be inspected and graded to comply with the exchange specifications, stored at a licensed warehouse, and fully insured against loss from fire, windstorm, and explosion (http://glossary.reuters.com, 2007; http://www.agriculture.state.ia.us, 2007).

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http:// www.agriculture.state.ia.us

Life of Contract

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Unlike stocks, futures contracts have limited lives. The life of contract refers to the period of those limited lives. It is typically used as an adjective, as in "life-of-contract high" or "life-of-contract low," meaning the highest price or lowest price at which the contract traded since it was listed.

For example, the June 2008 live cattle futures contract was listed for trading on January 2, 2007 and its last day of trading (or maturity date or expiry date or expiration date—all terms for the same thing) was June 30, 2008. The life of contract for June 2008 live cattle futures refers to the 18-month period of time between those two dates. If on July 1, 2008 an analyst said the life-of-contract high was $105.50, it would refer to the highest price during the 18-month period. But if someone mentions a life-of-contract high or low while the contract is still trading, then it means for the period from contract listing only up until that date.

Depending on the underlying asset, there are significant differences in the lives of contracts. For example, each Japanese yen contract is listed for 18 months, while each S&P 500 contract is listed for 24 months. At the other extreme are contracts such as eurodollars and crude oil. Eurodollars typically has a 10-year life of contract while

crude oil can be as much as 8 years. These differences are driven by differences in the demand for trading in the specific contracts. For example, in the case of eurodollars, because swap dealers are entering into OTC swap contracts with institutions that go out for 10 years and since they need to often hedge the risk associated with these contracts, they need instruments that go out for a similar period of time. In the case of stock indexes, on the other hand, even if an individual needs protection or exposure for a longer period of time the historical tendency is to take advantage of good liquidity in the nearby months and if, by the time the front month contract expires, the trader still needs exposure or protection, then the trader engages in what is referred to as a roll. A roll involves moving one's position to a more distant month by offsetting the position in the nearby month and simultaneously establishing a new position in the more distant month.

The context in which life of contract is typically used is when referring to price statistics, like high and low. Traders are interested in the high and low prices during the previous trading day, possibly during the previous week or month, and certainly during the life of contract. In addition, when one is analyzing futures data for different purposes, especially when one is engaging in technical analysis, a decision must be made about whether to look at the life of contract data, which is of course limited to the length of the life of that contract, or continuous (or continuation) data. Continuous data is created by splicing together the prices for the nearby contracts during their last few months of life, but stopping usually a few weeks before the contracts expire. Stringing nearby prices together allows you to analyze many years of prices.

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Limit

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> Price limits are market mechanisms that aim to restrain extreme oscillation in prices (Fernandes and Rocha, 2007, p. 2).

Apart from not allowing large price movements, price limits confine the daily accountability of market players and give investors time to reconsider the basic value of the securities after a limit hit and research shows that futures trading volume tends to decrease on limit hit days (Reifen et al., 2006).

The limit up or down is the maximum price advance or decline from the previous day's settlement price permitted for a futures contract in one trading session, as fixed by the rules of an exchange.

> The financial literature includes arguments both in favor and against price limits. The empirical evidence is also not definitive in that there is evidence supporting both the beneficial and adverse effects of the price limits. The main dispute relates to whether the price limits have a cool-off effect that stabilizes prices once they approach a limit, or a magnet effect that accelerates prices toward limits. (Fernandes and Rocha, 2007, p. 15)

Limit move. A price having advanced or declined the allowable limit throughout a single trading session.

Exercise limit. A limitation on the number of option contracts of a single class that anyone can exercise during a certain time frame.

Limit order. An order whereby the client designates the smallest sale price or the largest allowable purchase price.

Lock limit. A lock limit transpires when the trading price of a futures contract on the exchange has a prearranged limit price. At the lock limit, trades that are higher or lower than the lock price are not carried out.

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Limited Partners

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Limited partners are investors in a limited partnership. A limited partnership is a professional intermediary specialized in fund management that raises capital from investors, or the limited partners, and invests the money in corporations in exchange for ownership stakes. The limited partners provide the capital but do not take part in managing the fund or advising the portfolio companies, which is a major responsibility of their counterparts (the general partners). Like the shareholders in a corporation, limited partners also have limited liability, that is, liable only to the extent of their original investment, and are protected in general from any further losses and legal actions. The general partners manage the funds and assume the financial and legal obligations. The limited partners have priority over the general partners upon liquidation and receive a large fraction of the capital gains proportional to their original investments as defined by the partnership agreement. They can be wealthy individuals or corporations and can choose to invest in limited partnerships instead of directly in the companies because they do not have the expertise in the field nor access to information in the private equity market that the general partners have. They pay the general partners a fee to cover the costs of fund management.

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Limited Partnership and LLC

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A limited liability company (LLC) and a limited partnership (LP) are two types of corporations in the United States. LLCs offer limited personal liability to their owners

while its other characteristics make it more like a partnership. The LLC provides greater management flexibility and allows pass-through taxation (i.e., no double taxation) for investors. Another important advantage of LLCs compared to other corporations is that there are fewer administrative requirements; for example, it is not necessary to hold an annual shareholders' meeting.

With small LLCs the owners participate equally in the management of their business, which is called member management. An alternative management structure, one that is widespread in the hedge fund industry, is manager management. In this case the management is delegated to one or more owners (sometimes even to outsiders), which act as agents of the LLC and make the management decisions. The nonmanaging owners do not participate in the day-to-day operations but they do share the LLC's profits.

A limited partnership is distinct from a limited liability company, with regard to liability and taxation. LPs consist of general partners and limited partners. The general partner is responsible for the management activities and has full liability for the debts of the partnership. The limited partners are not involved in the operations of the company; they just supply the capital. Furthermore, they are only liable to the extent of their investment. The general partners pay the limited partners a dividend on their investment as compensation. The residual remains for the general partner.

There are comparable corporate entities in other countries. Counterparts of the LLC are the British Limited liability partnership, the German Gesellschaft mit beschränkter Haftung, or the Japanese godo kaisha. However, the characteristics of LLCs and LPs described here are specific to the United States.

Liquid Markets

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Originally, liquidity represents the easiness for a security to be converted into cash in a very short term (e.g., stocks, Treasury bonds, and money market securities are liquid assets). Such a concept is closely linked to the reversibility feature of an investment in financial securities. Generally, liquidity reflects the easiness for market participants (e.g., investors, dealers, brokers) to find a counterpart to trade with. In a liquid market, trading takes place continuously at both the buy side and sell side levels.

Financial markets generally intend to provide investors with liquidity, which requires transaction services as well as corresponding costs, and implies also transaction costs. These types of costs may impact securities' market prices in the short term. Namely, the service offered for being able to trade a security at any time has a price (e.g., bid-ask spread). However, liquid markets are usually characterized by low transaction costs and high trading volumes. In particular, market microstructure defines a liquid market as a market exhibiting tightness (i.e., small bid-ask spreads), depth (i.e., small price impact of large trades), and finally resilience (i.e., closeness of observed market prices and fair asset values).

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Liquidate

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A trader liquidates a position when an existing position is converted to cash. In the futures market, there are three means to close or liquidate a futures position: delivery, offset or reversing trade, and exchange-for-physicals (Kolb, 2000). Delivery allows completion through cash settlement where traders execute payment at expiration of the contract to settle any gain or loss. The vast majority of contracts are closed via other means of delivery or cash settlement. Offset or reversing trades occur when the trader executes a trade in the futures market to balance the net futures position to zero or flat. The majority of futures contracts are closed or liquidated through offset or reversing trades. Exchange-for-physicals (EFP) is a third way to close a position. In an EFP, two traders agree on the price of the physical commodity and agree to cancel off their futures and then proceed to take or make the delivery of the commodity (Kolb, 2000). A position may also be liquidated by a broker if the customer or trader fails to meet a margin call. Every participant on the exchange is required to recognize the day's gains and losses on trades. If the amount of a loss in a customer's account falls below an initial margin requirement, a margin call is issued by the futures commission merchant. The trader must supply enough funds to meet or exceed the initial margin requirement; if this is not met, then the futures commission merchant may liquidate the positions to cover the margin call (Levinson, 2006).

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Live Hogs Market

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According to Strong (1989), there are futures markets for both live hogs and pork bellies. A live hog futures market establishes prices for hogs that will not be delivered until some time in the future. A producer may resort to this market to hedge its meat production. A hog producer may think that the spot price of hogs will have decreased when hogs are ready for delivery. The futures price allows him "freezing" the future spot price for hogs. He can thus calculate its future profit margin exactly assuming that he also knows with certainty his costs to produce hogs and presells the hogs in the futures market. The futures contract is similar to an insurance contract for the hog producer. According to McKissick et al. (1997), hog hedgers currently have two futures markets from which to choose in the United States: (i) The Chicago Mercantile Exchange's contract, which is a 40,000 of carcass weight one; and (ii) the MidAmerica futures market exchange contract, which is a 25,000 of live weight one. The carcass contract represents about 216 head of 250 lbs live market hogs. The live hogs market may also be used by investors who speculate on the price of hogs. A closely watched statistics by investors and speculators on the live hog futures

market is the hog/corn ratio, which is simply the number of bushels of corn it takes to equal the value of 100 lbs of live pork (Strong, 1989). The higher the ratio, the more attractive it is to raise hogs.

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Lock-Up

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A lock-up prevents certain shareholders of a firm from selling their shares during and/or after the placement of shares in the stock markets. Usually, lock-up requirements are part of the legal conditions for a public offering. The general rationale behind lock-up provisions is to protect new shareholders for a certain period of time from potential losses caused by old shareholders unwinding their investments by selling large stock packages. Such negative stock price reactions can economically be viewed as market participants' interpretations of negative information about the value of the companies revealed by the potentially strategic behavior of the inside investors.

Empirical studies about stock price behavior around lock-up expiration dates have shown that in venture capital finance this problem is even more important for a number of possible reasons. First, because of the predominant role of informational asymmetries about project quality, the capital market learns about the company value only in the subsequent time after the initial public offering (IPO). Additionally, venture capitalists are generally perceived as active investors, adding value to the companies beyond their capital contribution by means of their management knowhow, reputation, etc. Hence, if the venture capitalists leave too early, it may have negative consequences for the further development of the firm value. Other possible sources of uncertainty about strategic behavior of investors in venture capital-backed companies with respect to the amount and time of their disinvestments in and after an IPO are, for example, tax considerations or the opportunity costs of nonredeployed cash, relative to alternative investment opportunities. Investors in venture capital–backed firms, therefore, face the fundamental trade-off between selling their shares early at an underpriced value and waiting until the fundamental value of the firm is revealed. In order to improve transparency and impose credible limitations to strategic behavior, lock-up clauses are often agreed upon as explicit covenants in financing contracts specifying different lock-up periods between the venture capitalist and other related insiders such as company founders, management, other investors, etc.

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Lock-Up Period

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A lock-up period is the minimum investment holding period required by hedge funds. During the lock-up period, the investors cannot take money out of the fund. The hedge fund industry distinguishes between hard and soft lock-ups. A soft lock-up can be neutralized by paying an early redemption fee, a hard lock-up cannot. In general, most hedge funds require a 12-month lock-up period. A lock-up period also refers to the initial subscription—hence, when reinvesting more funds, investors are again subject to the lock-up period, even if the initial period has expired. Lock-ups mean more flexibility for hedge fund managers because they can stay invested in illiquid assets for a longer period of time.

Numerous academic studies have found a positive correlation between the length of the time the capital is invested and the hedge fund performance. One explanation for this phenomenon may be the illiquidity premium investors realize if they are willing to provide capital to a hedge fund over the long term. The liquidity realized by hedge fund investors, however, is always expected to be a function of the liquidity of the traded instruments. Aragon (2004) found that the yearly return of hedge funds with lock-up periods is about 4% higher than the return of those without lock-up periods. Agarwal et al. (2004) found that hedge funds with a respective track record and a lock-up period generally do not receive the same amount of capital as comparable hedge funds without lock-up periods. At the same time, however, they note that hedge funds with restrictive capital outflow mechanisms are expected to show better future returns because of the possibility of holding illiquid positions. These results coincide with those of Liang (1999), who finds that the large hedge funds with long lock-up periods and short track records exhibit superior performance overall.

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Long Position

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In finance, a long position indicates that the investor/trader promises to purchase an asset in the future. As a result, an increase in the asset price creates a gain for the holder of a long position contract. In the derivatives market, a long position implies that the holder of a long position contract promises to purchase the asset at a prespecified price for the delivery of the asset at a future date. For example, a trader taking a long position in a commodity futures contract promises to purchase the commodity at the delivery date by paying the prespecified future price at the delivery date. Similarly, a long position in a call option for a foreign currency indicates that the holder of the option contract

will take delivery of the foreign currency at the maturity (or perhaps before maturity depending on the type of option contract). To sum up, one of the parties to a contract involving a derivative assumes a long position and commits to buying the underlying asset/instrument on a certain future delivery date for an agreed-upon price. The other party takes a short position and commits to selling the same asset/instrument on the same delivery date for the same agreed-upon price.

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Long Short Equity

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"Make money on alpha." Long short equity is a strategy that belongs to the category of opportunistic strategies. In long short strategies, undervalued equities that are expected to rise are bought long and/or overvalued equities that are expected to decline are sold short on spot and on futures markets. The long short disciplines are equity hedge, equity nonhedge, and short selling. Equity hedge portfolios are, usually, leveraged long positions that are hedged with derivative securities or short selling of stocks/stock indices at all times. For example, a manager could hedge the market risk with a put option on the relevant index. Equity nonhedge funds are very similar to traditional investment funds. Typically, they are long in equities and perform stock picking, but occasionally they also make use of derivatives and short selling. Short sellers concentrate on stocks with expected price losses. They generally assume that the market for short sales is less efficient because most investors try to find undervalued stocks.

Among others as a consequence of the chosen long short discipline, the long short equity portfolio can be long biased, short biased, or market neutral. A long biased portfolio has a net long position that results in a positive correlation to the market. The opposite is true for a short biased portfolio. Thus, the hedge funds can actively participate in falling (negative beta) or rising (positive beta) markets (market timing strategy). The special case of zero beta is called market neutral. For instance, this can be reached by the use of index derivatives.

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Long the Basis

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A person or firm is termed "long the basis" if he or the firm buys a commodity in the

TABLE 1

Hedgers Making Profits or Losses

Price Movement		To One Who is in the "Long" in the Cash Market	
Cash Price	**Futures Price**	**Unhedged**	**Hedged**
Falls	Falls by the same amount as cash	Loss	Neither profit nor loss
Falls	Falls by a greater amount than cash	Loss	Profit
Falls	Falls by a smaller amount than cash	Loss	Loss, but smaller than an unhedged loss
Falls	Rises	Loss	Loss, but greater than an unhedged loss
Rises	Rises by the same amount as cash	Profit	Neither profit nor loss
Rises	Rises by a greater amount than cash	Profit	Loss
Rises	Rises by a smaller amount than cash	Profit	Profit, but smaller than an unhedged loss
Rises	Falls	Profit	Profit, but greater than an unhedged loss

Source: Yamey, S. B. (1951).

cash market and places a short hedge position by selling it in the futures market. This is common in the commodity market, particularly for precious metals. The commodity holder protects himself against a price decline in the cash market by selling futures contracts on the commodity owned (Teweles and Jones, 1987). If the commodity price in the futures market moves up or down by the same amount as that of the cash commodity, the cost of hedging will be the dealer's commission. The hedger will profit when the basis is positive (strengthening). If the cash price rises by a greater amount than futures, the hedger makes a profit (see Table 1).

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Lookback Straddle

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A lookback straddle is an option strategy composed of a lookback call option and a lookback put option. The former grants its holder the right to buy an asset at the lowest price observed during the lifetime of the option while the latter grants its holder the right to sell the same asset at the highest price observed during the lifetime of the option. A lookback straddle thus enables the investor to "buy low and sell high." Goldman et al. (1979) discuss a closed-form solution for its Black–Scholes no-arbitrage price.

Among option strategies, the lookback straddle is of particular interest due to its close connection to the return profile of trend-following hedge funds. More specifically, the majority of commodity trading advisers, or managed futures funds, are

"trend followers." So-called primitive trading strategies (PTS) capture the essence of such dynamic trading strategies using static easy-to-understand algorithms. For example, the payoff of a perfect market timer who may only take a long position should be identical to the payoff from holding a call option. If, on the other hand, it is possible to go long or short, the perfect trend follower should "buy low and sell high," which exactly corresponds to the payoff of a lookback straddle. Consequently, the lookback straddle can be thought of as the PTS used by market timers.

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Lookback Straddle (An Example)

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Let us consider a lookback call option. During the lookback period the highest price of underlying asset is $S_{\max}$, and the price at present is S_t, then the payoff of this lookback call option is

$$\text{Payoff}_{\text{call}} = S_{\max} - S_t$$

Similarly, for the lookback put option, the payoff depends on the minimum price in the lookback period:

$$\text{Payoff}_{\text{put}} = S_{\min} - S_t$$

Since the lookback straddle is the kind of construction of the lookback call and lookback put options, this strategy is benefited by taking the difference of the highest and the lowest prices of underlying assets:

$$\text{Payoff}_{\text{lookback straddle}} = S_{\max} - S_{\min}$$

Losing Streak

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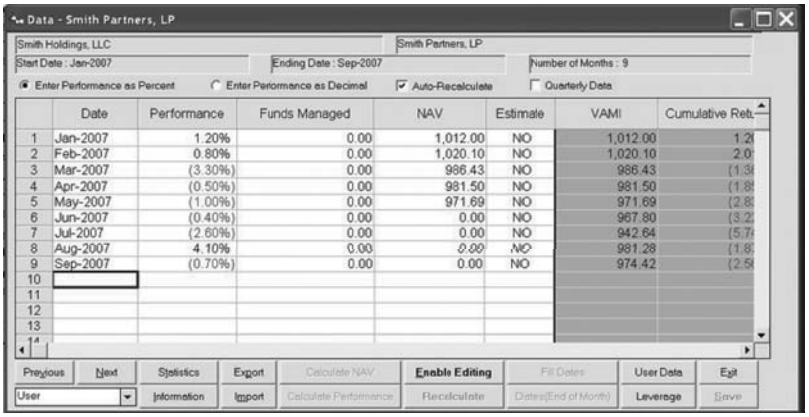
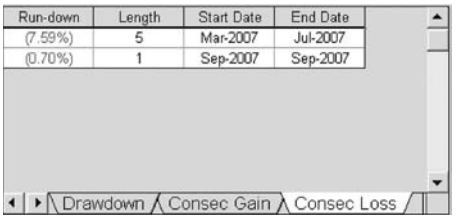
A losing streak refers to a period of time defined by consecutive monthly losses (i.e., negative returns) incurred by a hedge fund or other investment. In the example below, the losing streak starts with the March 2007 return (−3.30%) and ends with the July 2007 return. In August, this manager posts a positive return, thus ending the losing streak. A losing streak is different from a drawdown in that a drawdown refers to the greatest amount of loss sustained after hitting an equity high until a new equity high is reached. To end a losing streak, a manager does not have to achieve a new equity high, but instead must only post a positive monthly return. In the example below, the manager remains in a drawdown in August 2007, even though the manager's losing streak was broken.



Another way to express a losing streak is as an aggregate return that reflects the full loss incurred during the consecutive losing months. The table below shows that the manager above posted an aggregate loss of −7.59% during the March through July losing streak.



Loss Standard Deviation

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When thinking about the concept of risk, investors usually think about losses. Most often people think about risk as the standard deviation or volatility of all returns. In contrast, loss standard deviation measures the variability of returns below the target return. All positive returns are treated as zeros in the calculation as below:

$$\sigma_{\text{loss}} \equiv \sqrt{\frac{\sum_{i=1}^{n} \min[(r_i - r_t), 0]^2}{n(n-1)}}$$

T in the above equation can be thought of as a target rate where outperformance is measured. For example, a pension fund may have a target funding assumption that it must earn to be able to fund its pensioners. Any return lower than this can be considered a loss (even if the absolute return is positive) because the result falls short of what must be earned by the fund to meet its liabilities. In this case if the funding assumption is a 0.5% monthly return, anything less than 0.5% is taken into consideration in the calculation. Alternative target rates are typically the risk-free rate or zero.

The loss standard deviation was proposed because some investors do not believe that positive returns should be included in measurement of risk and therefore look to only consider negative returns. As such some investors replace the concept of standard deviation with loss standard deviation in various statistics as well as look at loss

standard deviation as a stand-alone metric. A prominent example of the use of this concept is the Sortino Ratio, which replaces the standard deviation in the Sharpe Ratio with loss standard deviation in the denominator.

However, as noted by Bacon (2004), loss standard deviation numbers should be viewed with caution due to the limited data points involved with its calculation. Since all positive observations are ignored, the number of data points that are available may not be sufficient to make a valid statistical argument.

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M

Managed Funds

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Actively managed funds are funds that try to outperform their benchmarks (usually the relevant indexes) through the implementation of a sophisticated investment strategy. In contrast, passive (index) funds match the performance of a particular stock market index such as the S&P 500 index in the United States or the EuroSTOXX 50 in Europe. Trading strategies of actively managed funds try to generate excess returns or lower investment risk. Trading strategies are usually built on technical or fundamental analysis of individual firms or sectors, anticipation of macroeconomic trends, or the application of (proprietary) models of the financial market. In turn, actively managed funds usually charge higher fees from investors compared to their passive index counterparts. In addition to that, more trading expenses are incurred because the portfolio composition is changed more frequently. On the other hand, trading expenses are usually rather low for index funds because the composition of stock market indices is stable over time.

In order to evaluate the performance of actively managed funds, returns must be put into relation to risk. Common measures are Jensen's alpha, Treynor ratio, or Sharpe ratio. Academic research has shown mixed results concerning the success of actively managed funds: On average actively managed funds tend to underperform their benchmarks since expenses and fees frequently reduce performance to a significant extent as found e.g. by Carhart (1997). Active management is primary suited for inefficient markets where fund managers may create value by investing in targets for which they have informational advantage. This point of view is substantiated e.g. by Kacperczyk et al. (2005) who document that concentrated funds perform better than broadly diversified portfolios.

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Managed Funds Association (MFA)

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The Managed Funds Association represents the interests of the alternative investment industry professionals, as well as the service providers who support the hedge fund industry. MFA's membership consists of professionals with an expertise in alternative investment strategies including hedge funds, funds of funds, futures funds, commodity trading advisors, and commodity pool operators.

Managed Funds Association promotes activities designed to advance the common purposes of all members of the alternative investment industry. It also enhances the image and understanding of that industry, furthers constructive dialogue with the regulators of the industry, and monitors and interprets regulations that direct the alternative investment industry.

MFA provides communication and education for investors, regulators, legislators, the financial media, and members; supports expansion of the industry through a representative office in Washington and its objective is mainly educational programs; and offers professional development for its members by providing a forum for the exchange of ideas among its members. MFA cultivates an environment where professionals from the industry have the best chance to better perform and at the same time serve the requirements of their clients.

The Foundation of MFA provides grants for economic, business, and financial research on the use of derivatives as an essential investment management tool. The Foundation makes grants available to universities, colleges, academic foundations, academic institutions, individuals, and other research entities.

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Management Buy-In

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A management buy-in (MBI) is the purchase of a company by an outside management team. In contrast to a management buy-out, where the purchaser is already working for the company, the outside management team wants to replace the existing management. The management buy-in group usually evaluates several companies searching for an undervalued business. The team leader is usually highly experienced, for example, a (former) board member of another company. By replacing the existing management and applying new strategies to the business, the management buy-in group intends to enhance the value of the company. The outside management team can either buy shares of the company (share deal) or assets (asset deal) or both (roll over). Most management buy-in transactions are leveraged buy-outs (LBO). The amount of capital needed to buy

the company is either provided through bank loans or through high-yield debt (junk bonds). The repayment of the loan is made out of the free cash flow generated from the company, whereas the assets of the company serve as collateral for the loans. The strategy of a management buy-in can also be combined with a management buy-out. If the outside management group considers any existing managers of the company of great further value, the new board of directors may also include a former manager of the company, who can share his experience with the new management group. In case of a family business, the question of succession can also be solved by a management buy-in.

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Management Buy-Out

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A management buy-out (MBO) is the purchase of a company by its existing management. The managers buy at least a large part of the shares or the whole company. Frequently the management team wants to gain independence and a chance to influence the future strategy of the business in order to achieve a capital gain by increasing the value of the company. Given that they are now investing their own equity, they tend to be highly motivated. Often the management will take the company private in order to avoid the duties and costs connected with being public. Another reason for the existing management to go for a management buy-out would be to save their jobs. The business would otherwise be shut down or sold to another company that would exchange the management. Since the managers of a company usually don't have enough money to finance the purchase themselves, the main challenge of a management buy-out is its financing. If the purchase is mainly financed by debt—either bank loans or bonds—the transaction can also be referred to as a leveraged buy-out (LBO). Another source of funds can be derived from private equity investors who get part of the shares in return for the capital invested. However, private equity investors tend to have different aims compared to the management. The latter will take a long-term view, whereas private equity investors want to maximize their returns by making an exit after a few years. In the meantime, they will impose certain terms on the management about the way the company should be run.

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Management Fee

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Management fee is an annual fee that is charged to investors regardless of the level

of return for a particular asset. This fee is a standard cost that money managers charge for managing investor capital. The costs associated with management include administration, investor relations, and professional management. Fees can be accrued on a daily, monthly, or even quarterly basis based on assets under management at the end, beginning, or an average for a particular period.

Hedge fund managers typically charge fees between 1 and 3% and these fees are substantially higher than other investment vehicles, such as mutual funds (Anson, 2003). Also, funds of hedge funds charge an extra layer of management fees in order to cover the expenses associated with investing in the underlying hedge funds as well as managing investor capital.

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Manager Skill

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Assessing manager skills is one of the most delicate tasks in investment management. In investment theory, manager skills relate to the ability of an investment manager to actively outperform a given benchmark strategy. Often, it is useful to break down skills into two components: selectivity and market timing.

To measure the performance contribution from actively managing an investment portfolio, we can resort to some equilibrium model that takes into account the systematic risk and its reward by the market. Since unsystematic risk can be diversified away at no cost, bearing diversifiable risks is not rewarded. Therefore, the measurement of manager skill should not be based on the total return and volatility of the portfolio itself; rather it should be geared toward the residual return and volatility that cannot be diversified away.

Commonly used equilibrium models are the one-factor capital asset pricing model (CAPM) or the multifactor arbitrage pricing theory (APT). Both the CAPM and the APT postulate a linear relation between systematic risk(s) and expected return. These models give the risk-return menu, which each investor can achieve through a passive portfolio strategy. Therefore, the CAPM and the APT serve as an adequate benchmark for active portfolio management.

With the ex-post version of the CAPM or APT, we can measure whether the investment manager has achieved an excess performance. The systematic factors can be represented, for example, by a broad stock index, a bond index, an interest rate spread, or some macroeconomic indices. We then regress the excess return on the excess returns of the factors using the following regression equation:

$$r_p(t) = \alpha + \sum_{i=1}^{N} \beta_{F_i} r_{F_i}(t) + \varepsilon(t) \qquad (1)$$

The regression coefficients β_{F_i} measure the sensitivity of the portfolio with respect to the systematic risk factors $r_{F_i}(t)$. The serially uncorrelated error term $\varepsilon(t)$ has mean zero and a constant volatility σ_ε. The sum $\alpha + \varepsilon(t)$ measures the change in portfolio value that arises from actively managing the portfolio. Since $\varepsilon(t)$ has zero mean, α measures the

mean excess return compared to a simple buy-and-hold strategy that passively invests in the underlying factor portfolio.

Another useful measure to assess the manager's skill is the R^2-value of the regression in Equation 1. It measures the fraction of the return variance that can be attributed to the variance of the factor returns. A low R^2 indicates that the investment manager departs strongly from the passive benchmark strategy. A large R^2 indicates that the active investment style is close to the benchmark.

There are many different performance measures based on the linear return specification in Equation 1. For instance, the reward-to-volatility ratio divides the excess return by the beta of the portfolio, that is, the systematic risk component. The Sharpe ratio divides the excess return by the total volatility of the portfolio return. The information ratio simultaneously accounts for the diversification aspect and the systematic risk by dividing the strategy's alpha by the residual volatility.

One problem related to these commonly used performance indicators is their static nature. Implicitly, we assume that the manager's skill is purely driven by the selectivity of the portfolio allocation. However, in practice, portfolios are often reallocated and subject to market-timing considerations. When assessing a manager's skill in terms of timing capabilities, a static linear model might not be the appropriate benchmark. Market timing gives rise to convex investment strategies. If the excess return on the market is large, then the portfolio return should be even larger. On the contrary, if the excess return on the market turns negative, the portfolio return should stay positive or at least above the market return. To take into account this convexity, Treynor and Mazuy (1966) suggest including a quadratic term into the standard linear regression:

$$r_P(t) = \alpha + \sum_{i=1}^{N} \beta_{F_i} r_{F_i}(t) + \sum_{i=1}^{N} \gamma_{F_i} r_{F_i}^2(t) + \varepsilon(t) \qquad (2)$$

Successful market timing would then give rise to a positive coefficient γ_{F_i}. A problem related to this approach is that the quadratic terms in Equation 2 produce multicolinearities and, hence, the regression may be subject to large estimation errors.

As an alternative, Merton (1981) and Henriksson and Merton (1981) suggest using insights from option pricing theory. They approximate the convex payoff of a market-timing strategy by an option contract. A perfectly timed portfolio would correspond to a static portfolio fully protected with a put option. To assess the manager's timing skills, they use the following regression:

$$r_P(t) = \alpha + \sum_{i=1}^{N} \beta_{F_i} r_{F_i}(t) + \sum_{i=1}^{N} \gamma_{F_i} \max[0, r_{F_i}(t)] + \varepsilon(t) \qquad (3)$$

where the portfolio P corresponds to a passively managed portfolio that is invested with β_{F_i} in the factor portfolios $r_{F_i}(t)$ and with $1 - \sum_{i=1}^{N} \beta_{Fi}$ in the riskless money market account. In addition, the portfolio is long in put options at a price of α to reduce the factor exposure by γ_{F_i} in case the factor's excess return r_{F_i} drops below zero.

Hence, the regression in Equation 3 allows us to disentangle the portfolio return in terms of the manager's selection capabilities (α), the manager's market-timing capabilities (γ_{F_i}), and the systematic factor exposures (β_{F_i}).

If γ_{F_i} is positive and statistically significant different from zero, then the investment manager has market-timing skills. If α is positive and statistically significant different from zero, the manager also has selection skills.

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Many-to-Many

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Many-to-many refers to a trading platform in which there are multiple buyers trading with multiple sellers and specifically where the participants can make bids and offers or accept bids and offers made by others. This is in contrast to one-to-many markets where a single counterparty trades with all comers. Many-to-many is the most common type of market, and all exchanges and markets that are regulated by the CFTC, even lightly regulated ones, are many-to-many markets. While the Commodity Exchange Act does not define the terms many-to-many or one-to-many, it does define "trading facility" in such a way that a many-to-many platform is a trading facility and a one-to-many platform is not.

This is relevant because one-to-many markets are exempt from CFTC regulations (such as those described in Section 2(g)), or mostly exempt from CFTC regulations (such as those described in Section 2(h)(1), which are subject only to regulations prohibiting fraud and manipulation). Many-to-many markets, on the other hand, are generally subject to CFTC regulations. But the Commodity Exchange Act, like most legislation, is messy and complex and there are some many-to-many markets that are exempt from CFTC regulation. For example, under Section 2(d)(2), the "electronic trading facility exclusion," entities called eligible contract participants can trade commodities called excluded commodities on electronic many-to-many markets and be exempt from CFTC regulations.

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Margin

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A margin is collateral that the owner of a position in futures contracts, options, or other securities must deposit to cover the credit risk of his counterparty, a broker, or a clearinghouse member. Hence, the key role of margins is to make markets operationally

smoother by limiting default risk. This risk can arise if the holder has completed any of the following:

1. Entered into a futures contracts
2. Sold securities (including derivatives) short
3. Borrowed cash from the counterparty to buy securities

The collateral a trader has to provide can be in the form of cash or short-term bonds, or any security allowed by the specific terms of the related contract. The portfolio margining systems is rather simple. The collateral, that is, cash, is deposited on a *margin account*. The amount that must be deposited at contract inception is called initial margin, or *initial* margin requirement. At the end of each day the margin account is adjusted to reflect the trader's profit and loss: this is the mark-to-market mechanism.

There is a minimum amount, the maintenance margin, of collateral that must be maintained in a margin account, to ensure that the balance never becomes negative. This minimum amount is also referred to as minimum maintenance. This level is a minimum, and a number of brokerages have maintenance requirements lower than the initial margin. Finally, the investor will receive a margin call if the value of the securities in the portfolio drops below the maintenance margin: the investor has to deposit extra-collateral, known as variation margin, to bring the account up to the required level. If this does not happen, the broker closes the position, limiting counterparty risk. See Duffie (1989) and Hull (2005) for an alternative description of the margining mechanism.

A number of market participants are involved in the margining process. Traders are required to maintain margin accounts with brokers. Brokers (if they are not clearinghouse members) are requested to maintain margins, called clearing margins, with members of the clearinghouse. The clearinghouse acts as an intermediary that settles trades and regulates delivery.

Portfolio margining is one of the most important financial safeguards, ensuring integrity to the system. In fact, the clearing service provider settles its accounts daily. As daily closing prices change the value of outstanding positions of each underlying or index in customers' accounts, the clearing service provider collects margins from those who have lost money, and credits the funds to the accounts of the investor having made a profit. Thus, prior to the start of each trading day, the entire amount of losses on the previous trading is collected and all profits are credited. Basically, a futures contract is closed out and rewritten each day, thus avoiding major losses.

In addition, many exchanges use real-time risk system in order to determine the margin requirement on the basis of the estimated risk in a customer's portfolio, projecting the potential losses (e.g., estimating value-at-risk and performing stress tests, often with sophisticate risk models) that could be created by various moves in the underlying equity or index markets. Doing so, since portfolio margining accounts better reflect this actual market risk, these exchanges can require less equity on deposit, providing greater leverage to the investors.

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Maintenance Margin

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The requirements for margin and daily settlement are the chief safeguards for any futures market. The main underlying principle of a margin is to supply a financial safeguard ensuring that traders will carry out their contract obligations. As the margin requirement restricts the activity of traders, exchanges and brokers try to ensure that the margin requirements are not unreasonably high. The margin amount can vary from contract to contract and may vary by broker as well. In 1988, the Chicago Mercantile Exchange introduced SPAN (Standard Portfolio Analysis of Risk) portfolio, margining for futures contract at both the clearing and customer level. This system has formed the basis to evaluate risk in an entire portfolio to match margin to risk that has been in use for many years in around 30 exchanges worldwide.

There are two types of margins that serve as safeguards for the futures market. A trader must deposit an amount in either cash or eligible securities before trading any futures. This initial deposit is called the initial margin. Upon suitable completion of all obligations related to the trader's futures position, the initial margin is restored. Accrued interest is returned if a security served as the margin.

Because futures prices are volatile, each account will have frequent gains and losses. When the value of the trader's funds on deposit with the brokerage house attains a determined level, called the maintenance margin, the trader has an obligation to replenish the margin, bringing it back to its initial level. The demand for additional money is called a margin call. The extra amount the trader must deposit is called the variation margin.

For most futures contracts, the initial margin may be 5% or less of the underlying's value. This relatively low percentage is reasonable as the maintenance margin provides additional protection, whereby traders have to realize losses on the day that it occurs. The maintenance margin is generally about 75% of the initial margin.

EXAMPLE

Assume trader A wishes to buy one contract of Middle East Crude Oil Futures for $70. Assuming an initial margin of 5% and each contract is for 1000 barrels, the initial margin is $3500. The maintenance margin (75% of the initial margin) is $2625. If the price of Middle East Crude falls to $69.50 the next day; this represents a loss of $500 with resulting equity in the margin account equal to $3000. There is no margin call as the equity amount is more than the maintenance margin ($2625). On the following day, the price falls to $69. This represents a total loss of $1000 when the initial margin was computed. There will be a margin call as the equity amount is now $2500. The broker will now require that the trader replenish the margin account to $3500. The trader must now pay $1000 variation margin.

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Managed Account

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Managed or discretionary accounts are usually handled by professional brokers who trade independently but with the authority of the account holder. Managed accounts often occur in the context of the transparency problem of hedge funds. They are considered an alternative to a classical hedge fund construction, because they do not have hedge funds' problems of illiquidity (due to long lock-up periods), regulation, and, especially, lack of transparency (Kaiser, 2004). In the context of hedge funds, managed accounts are based on trading advisor agreements. An investor opens an account at a prime broker (usually chosen by the hedge fund manager), which is then managed in trust by a hedge fund manager (see Figure 1). Managed accounts were initially developed for (ultra) high-net worth individuals. The category has since expanded to include separately managed and multistrategy accounts, which can include up to 100 hedge funds also for less liquid investors.

Because the managed account itself is owned by the investor, he/she has control over operational due diligence (Cottier and Wessling, 2006). The investor obtains further benefits from high levels of customization. In other words, the investment guidelines of the account, such as the level of leverage and the combination of asset classes, are agreed upon individually (Kaiser, 2004). Other arguments for using managed accounts include return management items such as daily performance supervision, regular benchmarking, dynamic tactical allocation changes, as well as choice of hedge fund manager and cost-effective cash management. Structural advantages include high liquidity and daily reporting (for more details see Jaeger, 2006).

However, the most important advantages of managed accounts are in the context of risk management. The position and trading transparency of managed accounts allow for high levels of analyzing and reporting standards. Furthermore, the risk of fraud is greatly minimized, and "style drifts," or "trading errors," are recognized much more

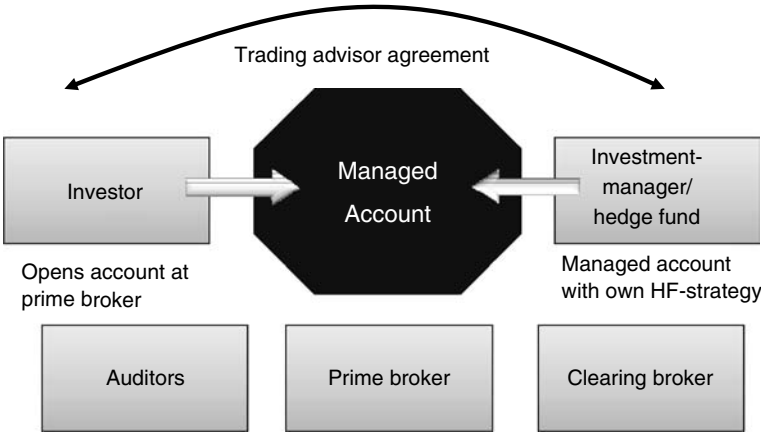

FIGURE 1
Managed account flow chart. (From Own Chart According to Absolut|Research.)

quickly (Jaeger, 2006). The tax transparency and efficiency are also higher compared to a classical fund structure. Theoretically, 99% of all hedge fund transactions could be reconstructed as managed accounts. However, there are mixed opinions over whether and how this would affect return levels (Kaiser, 2004).

There are, of course, some arguments against using managed accounts (see Jaeger, 2006 for a comprehensive summary). For example, hedge fund managers fear that confidential information on their trading strategies may be more likely to get leaked to the market. This could cause a loss of competitive advantage, or an increased risk that other market participants will trade against the hedge fund manager. Those arguments, however, are more applicable to prime brokers, who have signed confidentiality agreements. One important argument against using managed accounts is that the best managers may not share insight into their positions and trading strategies, which could result in missed investment opportunities and returns. However, thus far, there is no empirical evidence of a connection between return and position transparency, given the necessary operational infrastructure (Jaeger, 2006).

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Managed Account Platforms

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In a managed account strategy, the hedge fund manager acts on the basis of a trading advisor agreement. This strategy is replicated on an account bearing the investor's name. Managed accounts stem from investors' need to minimize the operational risk and the disadvantages of investing in hedge funds, such as illiquidity, a lack of regulation, and a lack of transparency. According to an empirical study of 100 hedge fund blowups by Kundro and Feffer (2004), 50% were triggered by operational risks such as fraud, data input mistakes, system crashes, and valuation problems. Managed accounts provide transaction and position transparency to investors via an electronic connection to the prime broker. This enables hedge fund managers to control asset management constraints such as maximum leverage, asset classes, investable regions, and no illiquid assets. According to Jaeger (2003), the managed account investor may also influence all the involved parties (e.g., prime broker, custodian, auditor) and the legal agreements (e.g., prime brokerage agreement, ISDA swap agreement). Table 1 provides a survey of the main structural differences between hedge fund and managed accounts.

By using managed accounts, investors can react quickly to hedge fund manager violations. They can thus close positions immediately (provided there is sufficient market liquidity), which greatly increases investment liquidity. Portfolio transparency

TABLE 1

Comparison of Managed Accounts versus Hedge Funds

	Managed Accounts	Hedge Funds
Legal Status	Single Account	Asset
Legal Framework	Trading Advisor Agreement	Sales Brochure/Brochure Liability Law
Additional Variants	Collective account at custodian	Fund of Hedge Funds
Prime Broker	Several prime brokers may be necessary if the prime broker preferred by the investor is not the fund manager's prime broker of choice.	There is generally one prime broker per fund, who is not chosen by the investors. The prime broker chooses positions and performs risk evaluation.
Custodian	Chosen by the investor	Chosen by the hedge fund. The prime broker is often the custodian.
Administration	Chosen by the investor	Chosen by the hedge fund. The prime broker is often the administrator.
Position Valuation	Chosen by the investor	Chosen by the prime broker, usually by using the latest market prices or fund manager models.
Transparency	Transparency results from insight into manager transactions/ positions. Exposures and changes are thus visible.	Hedge funds are not required to provide more information than they deem necessary. There is thus a lack of transparency, especially with arbitrage strategies, trading of illiquid positions, and short positions.
Exercising Influence	Investors can directly influence positions in their accounts if they detect manager violations.	No direct investor influence is possible. To combat this, wealthy investors may put together their own funds of funds.

enables independent position valuation by the custodian. It is also the basis for effective and active risk management. When investing in fund structures, position valuation is done primarily by the hedge fund's prime broker. Furthermore, when handling illiquid positions, it is possible that only the last available market price is placed in the books, or that the valuation of such positions is performed by the hedge fund manager himself using his models. The constant information flow and permanent account accessibility on managed account platforms are attractive for issuers of structured products with an underlying hedge fund asset. These properties provide optimal hedging and more precise risk control for products that have capital guarantee options.

Indeed, providers of investable hedge fund indices (e.g., ARIX, FTSE, MSCI, Dow Jones) prefer managed account platforms because of their higher liquidity and better transparency when selecting index constituents. However, the challenges of setting up a managed account, such as sufficient transaction volume and the large required resources, should not be underestimated. If, for example, a statistical arbitrage fund is to be replicated on a managed account, there may be thousands of transactions every day, which implies a large increase in administrative workload. The valuation methods are developed by the managed account operator, and the valuation interval is daily. This can cause difficulty and increased effort on the part of the manager if he does not trade liquid instruments and even OTC contracts on a daily basis. Without a valid valuation, the significance of portfolio transparency and short valuation intervals is questionable.

Regarding the necessary resources, investors often underestimate the requirements for administering position information for a hedge fund portfolio. A sophisticated risk management system generally costs U.S. $100,000, not including implementation and maintenance costs. Hence, the minimum investment volume for setting up a managed account is between U.S. $5 million and $50 million.

The managed account concept exists in various forms and variations, and is classified according to Giraud (2005) as follows:

- Standard Custodial Arrangements. The assets are held in a specific account managed by the hedge fund manager.
- Prime Brokerage Custody. The assets are held in the name of the fund in a specific account managed by the hedge fund manager. The prime broker may serve as an independent risk control and valuation entity.
- Basic Managed Accounts. The assets are held in the name of the investor on the books of the custodian. The manager has the right to manage this account based on the asset management agreement. The bank serves only as an independent valuation entity.
- Managed Account Platforms (MAP). The assets are held in the name of the investor in separated accounts. The bank or the platform operator is in charge of the back office, valuation, and risk control duties. The platform itself can engage in prime brokerage contracts.

Haberfelner et al. (2006) show that the advantages of managed accounts correspond to high opportunity costs. Hence, the Sharpe ratios realized by managed accounts are on average 50% lower than the average value of a large hedge fund database. This can be interpreted as a sign that investors in conventional fund structures realize a transparency and liquidity premium compared with those in managed accounts.

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Margin Call

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A margin call conforms to a call, in the form of an electronic message, or a phone call, from an investment professional/broker to a client, or either from a clearinghouse to one of its clearing members, asking for the deposit of cash or marginable securities to meet regulations governing margin accounts. The investor or the clearing member must deposit additional cash or securities so that the margin

account is brought up to the minimum maintenance margin. This is sometimes known as fed call.

At the close of each trading day, the value of securities in the investor's account is verified and compared to the initial and maintenance margin requirements set forth by the exchange. If the value of securities in the account is larger than the initial margin, then the difference must be removed or used to purchase extra contracts (this surplus is recognized as cash accessible among practitioners). However, if the value of the securities is less than the required maintenance margin as set forth by the exchange, a margin call occurs. The amount of the call is the difference between the value of securities and the initial maintenance requirement. All outstanding margin calls must be addressed instantly. The trader is required either to deposit additional money in the account or to sell part of his securities, liquidating his position. Accounts having an outstanding margin call are not permitted any further opening transactions or cash withdrawals.

If a trader does not meet a margin call, the broker has the right to sell his securities (even without consulting the trader) to increase the trader's account balance until it is above the maintenance margin. Not only traders, but also clearing members receive a margin call if one or more of the securities bought decreased in value below the maintenance margin. For a review of the margin call process see also Duffie (1989) and Hull (2005). A margin call is part of the portfolio margining system, one of the most important financial safeguards, ensuring integrity to the financial system, aimed to avoid, or at least limit counterparty risk.

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Mark-to-Market

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In general terms, mark-to-market is the widespread practice of revaluing a financial security to reflect the current values of the relevant market variables, ensuring price transparency.

In an exchange, mark-to-market is the procedure of documenting the price of a security, portfolio, or account on a daily basis in order to compute the gains and losses. This confirms that margin requirement is fulfilled, that is, the amount of money an investor is required to deposit in a margin account prior to purchasing securities on margin or selling short. See also Duffie (1989) and Hull (2005) on this topic.

Marking-to-market is a crucial part of the portfolio margining system, one of the most important financial safeguards, ensuring stability and integrity to the financial system, aimed to avoid, or at least limit counterparty risk.

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Market Neutral

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"Make money on spreads." The market neutral strategies make use of temporary price differences between similar financial instruments. When the manager identifies relative mispricings, he speculates that these spreads will be eliminated and goes long in the relatively undervalued and short in the overvalued instrument. Usually, there is only marginal market risk because of the opposite positions—the portfolio is market neutral. Sometimes, the residual market risk will additionally be hedged. The aim of the strategy is to get a portfolio with high alpha and zero beta. The most important market neutral strategies are fixed income arbitrage, convertible arbitrage, and equity market neutral. As the strategy focuses on relative price differences, it is also called relative value strategy.

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Market Order

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When an investor places an order with a broker to buy or sell a security, he has several alternatives that can influence the overall costs of the transaction and the price the investor pays or receives for the security. Different types of orders make a difference in whether the trade gets executed and at what price. A market order is an order placed with a broker at the market and requires an immediate trade at the best available price (Hull, 2006). Unless the investor specifies otherwise, the broker will execute the order as a market order. The market order has the advantage that it is almost always guaranteed that the order gets executed, whereas the market order has the disadvantage that in fast-moving markets the investor may not pay or receive the price he obtained from a real-time quote or from the broker's quote. Price quotes are only for a specific number of securities and by the time the broker executes the trade, the price of the security could be different. For a large order (i.e., number of shares), the investor receives different prices for parts of the order. The market order is considered as the simplest type of order; however, there are many other types of orders: limit orders, stop orders (or stop-loss orders), stop-limit orders, and market-if-touched orders (or MIT order or board order).

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Market-Timing Strategy

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Traditionally, market timing consists of shifting from stock and or bonds to more secure

or safe instrument having less risk (i.e., Treasury bills). Managers using this strategy either use fundamental or quantitative analyses to make their decisions. Market timing often refers to buying securities at a low price and reselling them at a higher price. The thematic behind this strategy is attempting to predict the future movement of stock prices using either technical or fundamental analysis. However, Fama (1965) coined the efficient market hypothesis suggesting that trying to time the market is futile and markets are efficient. Fama's suggestion is to simply buy the index. This notion is similar to betting on an entire horse race rather than just betting on one horse. Markets are efficient and it is impossible to predict where the market will be; therefore, when information becomes available, it is instantly incorporated into the stock market. Consequently any type of mathematic models trying to forecast the market's direction will not work. Markets follow a random walk and according to Malkiel (2006), foreseeing where the market will be in the future with some sort of reasonable efficiency and persistency over the long term is not possible. Hedge fund managers on the other hand believe that markets are inefficient and do not behave as a random walk.

A good market timer must predict the exit and the entry to be successful. Ellis (2002) calls this loser's game by undertaking to outperform the market over the long term. The longer the horizon the more difficult it is for money managers to consistently outperform the market. According to Bauer and Dahlquist (2001), buy and hold strategies using large cap stocks outperformed a market-timing strategy almost 99.8% of the time. The authors used backtested simulations with monthly, quarterly, and annual market-timing strategies during the 1926–1999 period for six well-known and major U.S. asset classes. However, Shen (2002) highlights that adhering to some general rules may be possible to avoid a number of market downturns by focusing on the spreads between the earnings price ratio (or earnings yield of an investment) of the S&P 500 index and interest rates.

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Maximum Drawdown

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A maximum drawdown is the greatest amount of loss sustained after hitting an equity high until a new equity high is reached. The dark blue line in Figure 1 represents the value-added monthly index (VAMI) for the S&P 500 Index.

The red dot indicates the lowest point, or valley, of the drawdown. The distance between the green lines is the *depth*, from peak to valley, of the drawdown. Two other characteristics to note are the length of the drawdown and the time to recovery. Table 1 displays a typical drawdown table on an investment, in this case the S&P 500.

Note that this table only displays the top five, or largest, drawdowns for the S&P 500.

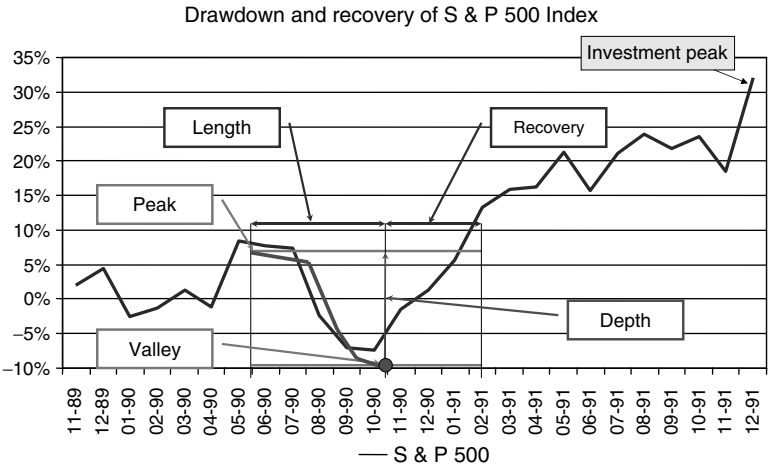

FIGURE 1
Maximum drawdown (worst loss).

TABLE 1

Drawdown of the S&P 500 July 1, 1997 to June 6, 2007

Drawdown (%)	Length (Months)	Recovery (Months)	Peak	Valley
−44.73	25	49	August 2000	September 2002
−15.37	2	3	June 1998	August 1998
−6.82	2	1	December 1999	February 2000
−6.24	3	2	June 1999	September 1999
−5.60	1	3	July 1997	August 1997

It also displays the length of the drawdown, and the date that the equity high (peak) and the drawdown low (valley) occurred. Using this information, investors can determine whether a fund may fit their risk tolerance level, and also what questions to ask the manager during the due diligence process. For example, if a large drawdown occurred in a month when an index or peer group was positive, an investor may want to inquire about strategy drift, leverage portfolio concentration, etc.

In addition, many investors make the assumption that the length of the drawdown includes only those months when the fund actually posts a loss, that is, the months leading up to the valley. However, it is important to remember that the fund remains in the drawdown until a new equity high is reached. If a fund loses 10% in one month, 5% the next month, but then makes 1% in the third, and 25% in the fourth, the length of the drawdown is three and not two months long. The maximum drawdown is the largest (deepest) drawdown the fund has experienced since it began operations.

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Maximum Price Fluctuation

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The exchange specifies a daily maximum price fluctuation for most futures contracts. The daily maximum price fluctuation is also called the "daily price limit." It gives an upper and lower limit for the price of a futures contract during one trading session. If the futures price moves up from the previous day's settlement price by an amount equal to the daily price limit, the futures contract is "limit up," and if it moves down by the price limit it is "limit down." A limit move is a price fluctuation in either direction equal to the daily maximum price fluctuation. Usually, if a futures contract is limit up or down, the trade ceases for that day (Hull, 2006). Maximum price fluctuations are specified in order to prevent excessive speculation. For example, the maximum price fluctuation for a crude oil futures contract is $10 per barrel or $10,000 per contract; for heating oil it is $0.25 per gallon ($10,500 per contract of 42,000 gallons). Note that the exchange has the authority to change the limits and there exist futures contracts for which no maximum price fluctuation is specified.

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Merger Arbitrage

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After the notification of a merger or acquisition, the stock of the target company normally trades below the price offered by the acquiring company. Merger arbitrage refers to the investment strategy that attempts to profit from the arbitrage spread, which is the difference between the offer price and current price of the target's stock. If the merger or acquisition is successful, the arbitrageur books the arbitrage spread as profit due to the fact that the price of the target's stock converges to the offered price—hence the arbitrage spreads closes to zero—as the consummation date approaches. However, if the merger or acquisition fails, the arbitrageur suffers a loss, usually much bigger than the profits earned if the deal would have succeeded. Cash and stock transactions are the two primary types of mergers and acquisitions. In a cash transaction, the acquiring company offers to pay a specific sum of money in exchange for the target company's stock, whereas in a stock transaction, the acquirer offers its common stock. In case of a cash offer the arbitrageur simply buys the target company's stock, whereas in a stock transaction, the arbitrageur sells short the acquiring firm's stock in addition to buying the target's stock.

The primary source of profits in the first type of investment is the difference between the purchase price and the cash received and the secondary source of profits is the dividend paid by the target company. In contrast, the long/short position has three sources of profit. The primary source of

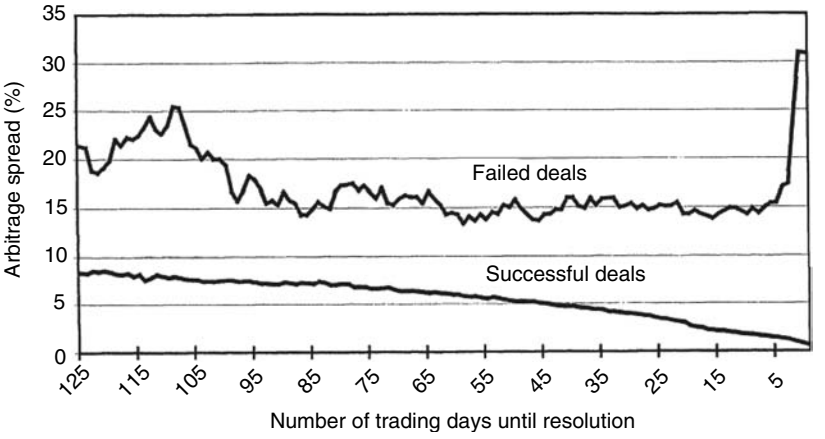

FIGURE 1
Median arbitrage spread of failed and successful deals versus time until deal resolution. (Reproduced from Mitchell, M. and Pulvino, T., *The Journal of Finance*, 56(6), 2135–2175, 2001.)

profits is the change in the arbitrage spread while the second source of profits is the dividend paid by the target company minus the dividend that must be paid on the acquirer's stock. The third source of profits is the interest paid by the arbitrageur's broker on the profits generated from the short selling of the acquiring firm's stock. Most stock transactions involve a fixed exchange ratio. However, many stock transactions have built-in collars that are designed to protect the shareholders of either the acquiring or the target company or both companies. In a collar offer, the acquiring company sets up ranges for the exchange ratio based on the average stock price of the acquirer over a specific number of days prior to the transaction's closing. Typically, the exchange ratio is structured to rise as the acquirer's stock price declines, falls as its price increases, and remains stable over a middle range. Besides collar offers, more complex deal structures involving preferred stocks, warrants, departures, and other securities or combinations of cash and stock transactions are common. Therefore, the first step of a merger arbitrageur is to calculate the different components of the arbitrage spread. Besides the time value of money, the risk premium for the completion risk is the main reason for a positive arbitrage spread, as the idiosyncratic risk of deal completion cannot typically be hedged. Figure 1 clearly shows the asymmetric payoff structure of merger arbitrage transactions, as the median arbitrage spread of failed deals widens dramatically on the termination announcement day whereas the median arbitrage spread decreases continuously as the deal resolution date gets closer. Therefore, predicting which announced merger or acquisition will be successful and which will fail is the most important task for merger arbitrageurs, as Branch and Yang (2003) show.

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Mezzanine Finance

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Mezzanine finance is typically employed in the expansion phase of a company and therefore belongs to the broader category of later-stage financings. This is because the prerequisites for a company to get mezzanine finance are strong, sustainable and predictable future cash flows, a strong market position with an established portfolio of products, a good track-record of the management, and a high financial stake of top management in the company. Mezzanine finance is a mixture between pure debt and equity financing with a long, but fixed time horizon. Private investors are compensated through a predetermined fixed interest rate, the debt component, which is usually lower than for pure debt, and a performance-related component, often in the form of so-called equity kickers that drives the expected return rate of the investment. The debt component of mezzanine finance is typically subordinated to existing pure debt and therefore participates like equity in occurring losses. Legally mezzanine finance is treated like debt on the balance sheet, but economically it shows characteristics of equity and therefore it is often also called quasi equity. Mezzanine finance lies at the end of the private equity spectrum and comes into play when the company has no or no sufficient access to external debt (banks or corporate debt) or equity (stock) markets, but nevertheless a strong upside potential. The biggest advantage of mezzanine finance lies in the almost unlimited flexibility of this instrument such that the structure of the deal can be well adapted to the financing needs of the company. For example, things to be agreed upon are the interest rate, the contract size, the maturity, the callability, the inclusion of equity kickers or other performance related components avoiding dilution effects, the role of collateral, the extent of covenants regarding information rights and duties, etc.

Minimum Acceptable Return

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Minimum acceptable return is a concept that is used in many performance measurement statistics to evaluate alternative investments. There is no set minimum acceptable return (MAR). Rather, minimum acceptable returns vary from investor to investor, because a MAR is simply determined by an individual's or institution's investing goal. For example, if a retirement plan has annual liabilities of 8%, the plan's investing goal, or minimum acceptable return, will be 8%. In other words, desirable returns for that entity will be those that are greater than 8%. If an individual investor's goal is to simply not lose money, his minimum acceptable return may be 0%, as any return above zero is acceptable. Still others may have a minimum acceptable return that is a benchmark, such as the S&P 500 or the Lehman Aggregate Bond Index, or a benchmark $+x$% to represent that only returns above what the investor can get in an index fund are acceptable. It is important to note that returns below a minimum acceptable return may not be negative, but they are not favorable based on that investor's goals.

Minimum Price Fluctuation

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When an exchange is developing a new futures contract, one detail, which has to be specified, is the price quote. The price quote for the futures contract should be convenient and easy to understand. For example, a crude oil futures contract is quoted in dollars per barrel to two decimal places (i.e., the nearest cent), live cattle futures are quoted in dollars per 100 pounds to two decimal places, and Treasury bond futures contracts are quoted in dollars and thirty-seconds of a dollar. The minimum price fluctuation is the smallest amount that the price of a given futures contract can fluctuate upward or downward. It is also called a "point" or a "tick." The minimum price fluctuation is consistent with the price quote (Hull, 2006). For example, for the crude oil futures contract, the minimum price fluctuation is 1 cent per barrel or $10 for a contract size of 1000 barrels. For the live cattle futures contract, one point is 1 cent per 100 pounds or $4 for a contract size of 40,000 pounds. For the Treasury bond futures contract, the minimum price fluctuation is one thirty-second of a dollar.

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Modern Portfolio Theory

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Modern portfolio theory (MPT) is a concept developed by Harry Markowitz, first published in the *Journal of Finance* in 1952 (Fabozzi et al., 2002). At the time it was highly revolutionary and has since changed the way investors view the framework for portfolio construction. Before MPT was introduced, investors viewed portfolios on a security-by-security basis and evaluated the risk reward payoff of each individual investment. The theory behind MPT includes the concept of diversification that shows if securities in a portfolio have low correlations, then the investor may be able to achieve a given level of return with reduced risk as defined by standard deviation. MPT assumes investors are rational and therefore always want higher return for a given level of risk or lower risk for a given return target. An investor may use MPT to build model portfolios by assuming returns, standard deviations, and correlations. Some investors use historical numbers and others

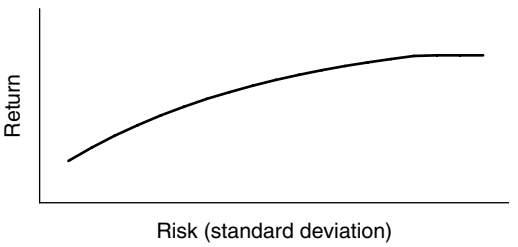

FIGURE 1
Efficient frontier.

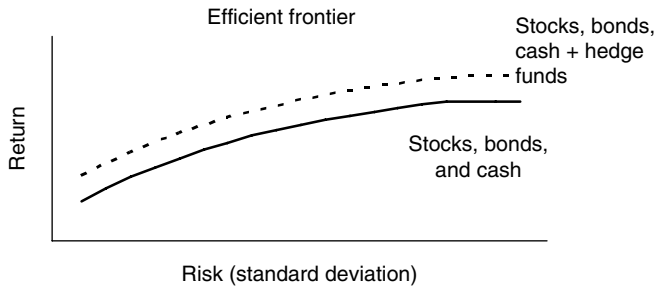

FIGURE 2
Efficient frontier with hedge fund allocation.

use expected values based on their beliefs of future performance. Figure 1 is an illustration that shows the efficient frontier, which is the set of portfolios that has the maximum return for each given level of risk.

One of the results of MPT shows the market is efficient over long periods of time, which means on average a manager cannot consistently beat the market. However, MPT also assumes a portfolio of assets. If this is the case, we must consider whether hedge funds are portfolios of assets to determine if MPT holds. As described by Park (2001), hedge funds are not like mutual funds because when they eliminate market risk by taking offsetting long and short positions the asset base is canceling out. Park concludes hedge funds are more like companies that can produce positive profits all the time and that there is a very powerful diversification effect from adding additional hedge funds into a portfolio. In fact he shows that similar to equity portfolios where most have between 50 and 100 stocks for diversification, fund of hedge fund portfolios should include at least 50 funds to realize full diversification benefits. Further, Park (2001) concludes hedge funds as an asset class that appear to have stock-like returns with bond-like risk and little correlation to both stocks and bonds. MPT predicts that a sufficiently diversified portfolio of hedge funds should be included in a traditional portfolio of stocks and bonds. However, one must not forget the underlying assumption of a normal return distribution for modeling portfolios under MPT and that hedge fund returns may exhibit significant skewness and kurtosis. Lastly, Figure 2 is an exhibit that shows how the efficient frontier shifts up from the addition of hedge funds to a portfolio of stocks, bonds, and cash. This demonstrates that by adding hedge funds to a traditional asset mix an investor can achieve a higher return for a given risk level or reduce risk for a given return target.

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Modified Jones Model

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The so-called "modified Jones model" is a variation of the original Jones model (see Jones, 1991) proposed by Dechow et al. (1995) to separate nondiscretionary and discretionary accruals, which are used for earnings management purposes. Like in the original Jones model, total accruals are regressed on a set of independent variables that are supposed to drive the extent of nondiscretionary accruals in the reporting period, thus letting the error term capture the unobservable extent of discretionary accruals. The only modification compared with the original model is that the change in revenues is adjusted for the change in receivables. This adjustment is only made in the event period (where earnings management is supposed), and the original model is fitted in the other periods. The reasoning behind this adjustment is that, contrary to the assumption in the original model, managers indeed have discretion over recognizing revenues, particularly when it comes to sales on credit. Hence, changes in sales on credit are more likely to be manipulated and therefore drive rather discretionary than nondiscretionary accruals. However, the modification implies that all sales on credit in the event period are connected to the earnings management activities. This is not a more convincing assumption than supposing that revenue recognition is not a subject to earnings management at all. It thus seems likely that the modified Jones model will overstate discretionary accruals (i.e., earnings management) when sales and receivables increase. However, Dechow et al. (1995) provide evidence for the modified model, exhibiting more power in detecting earnings management than the original model. Like the original model, the modified model also was criticized for overestimating the level of discretionary accruals within periods of extreme financial performance. Consequently, Kothari et al. (2005) empirically find that discretionary accruals estimations based on the original or the modified Jones model can be enhanced by performance matching. In the literature, various other modifications of the original Jones model have been discussed (see, e.g., Goncharov, 2005 for an overview). However, distributional tests and rankings have more often been used than accruals models in recent research (e.g., Leuz et al., 2003).

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Modified Sharpe Ratio

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The Sharpe ratio is defined as the expected return on an investment minus the risk-free rate divided by its volatility, measured by the standard deviation, and provides a risk-adjusted performance measure. Mathematically, it can be expressed as

$$\text{SR} = \frac{E(R) - R_f}{\sigma}$$

where $E(R)$ denotes the expected return on an investment, R_f is the risk-free rate, and σ is the standard deviation of the return. The Sharpe ratio measures the rewards per given unit of risk, where risk is represented by the standard deviation. Mean-variance investors would prefer to hold a portfolio with the highest Sharpe ratio, thus providing maximum expected return for a given level of volatility. Empirically, the Sharpe ratio is typically determined by using average returns and the sample standard deviation over a given period, providing justification to the use of the Sharpe ratio as an ex-post performance measure. To evaluate the merits of an individual asset or investment opportunity, the Sharpe ratio is typically not very attractive as it is scaled by the total risk of the asset, including its idiosyncratic and potentially diversifiable risk. Accordingly, the Sharpe ratio is considered more appropriate to assess the performance of a portfolio of assets.

The Sharpe ratio is based on the mean-variance approach and thus equates risk to standard deviation. While this is appropriate and not restrictive under normally distributed returns, many investments, including hedge funds, are characterized by return distributions that are skewed and fat-tailed. Further, Goetzmann et al. (2007) state that the Sharpe ratio and various related reward-to-risk measures can be manipulated with option-like strategies, which have highly nonlinear payoffs. As a result, several authors have proposed alternatives to the Sharpe ratio that are based on different measures of risk. Without exception, these measures reflect the downside risk of the investment. One alternative is the Sortino ratio, which replaces the standard deviation by the downside deviation, defined as the standard deviation of the asset returns below a minimum acceptable return (often zero or the risk-free return), and replaces the risk-free rate by the minimum acceptable return. Mathematically,

$$\text{Sortino ratio} = \frac{E(R) - \text{MAR}}{\text{DR}}$$

where MAR denotes the minimum acceptable return and DR is the downside semideviation, defined as

$$\text{DR} = \sqrt{\frac{1}{n} \sum_{R_t < \text{MAR}} (R_t - \text{MAR})^2}$$

This modification of the Sharpe ratio does not penalize the portfolio's performance for upside volatility, as only variation below MAR is taken into account. Pedersen and Satchell (2002) provide additional details and discuss the theoretical foundations of the Sortino ratio. However, Goetzmann et al. (2007) show that the Sortino ratio can also be easily manipulated.

An alternative measure of downside risk is value-at-risk (VaR), which is the maximum amount at risk that can be lost within a given holding period at a particular confidence level. At a confidence level α, the VaR is the solution to

$$P\{x \leq -\mathrm{VaR}_{\alpha}\} = 1 - \alpha$$

where x is the (stochastic) value of the portfolio (at a given holding period). For a normal distribution, the VaR can be derived from the mean and variance of the return distribution (for a given level of initial wealth W_0). For example, if $x \sim N(\mu, \sigma^2)$, the 5% VaR is given by

$$\mathrm{VaR}_{5\%} = W_0(\mu - 1.645\sigma)$$

where 1.645 is the one-sided 5% critical value of the standard normal distribution. Estimating the VaR without making distributional assumptions is less trivial, particularly if only a limited number of returns are observed. Favre and Galeano (2002) propose an empirical VaR measure, referred to as "modified VaR" that approximates the 1 or 5% critical value of any distribution using its empirical third and fourth moments, that is, skewness and kurtosis. The modified VaR is employed by Gregoriou and Gueyie (2003) to construct a modified Sharpe ratio as the excess return per unit of VaR, that is,

$$\text{Modified-SR} = \frac{E(R) - R_f}{\mathrm{MVaR}}$$

where MVaR is the modified value-at-risk. Gregoriou and Gueyie (2003) demonstrate that for hedge funds the modified Sharpe ratio is more accurate and typically lower than the traditional Sharpe ratio. As the Sortino ratio, the modified Sharpe ratio does not penalize the portfolio's performance for upside volatility. Alternatively, Goetzmann et al. (2007) propose a manipulation-proof performance measure, which looks like the average of a power utility function, calculated over the return history. They argue that this measure is particularly compelling in the hedge fund industry.

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Modified Value-at-Risk

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Normal value-at-risk (VaR) models rely on the assumption of normally distributed returns. However, as the return distributions of alternative investments do not conform to the thin-tailed and symmetrical normal distribution, modified VaR models should be used to incorporate the asymmetries and fat tails as McNeil et al. (2005) demonstrate. Financial theory provides two modified VaR models, the Cornish–Fisher VaR and a VaR model based on the extreme value theory (EVT). In contrast to the Cornish–Fisher VaR, which incorporates both asymmetries (skewness) and fat tails (kurtosis) of the return distributions,

the VaR model based on the EVT focuses only on the tails of the return distribution, as the EVT deals with the modeling of distribution of extreme returns. Embrechts et al. (2003) show, that in practice, extreme value theory provides two ways of identifying extreme returns. The first approach is called the block maxima (BM) method, which classifies the maximum return M in successive periods of length n as extreme returns. The second approach focuses on the returns that exceed a given threshold u and is therefore called peaks over threshold (POT) method. The distribution of normalized maxima $x = (M_n - \mu_n)/\sigma_n$ is modeled by the generalized extreme value distribution, which is given for $1 + \xi \cdot x > 0$ by

$$H_\xi(x) = \begin{cases} e^{-(1+\xi \cdot x)^{-1/\xi}} & \text{falls } \xi \neq 0 \\ e^{-e^{-x}} & \text{falls } \xi = 0 \end{cases}$$

where ξ is the shape parameter, which reflects the weight of the tail. The distribution of the excess returns beyond the threshold $y = r - u$ is modeled with the generalized Pareto distribution (GPD), which is given by

$$G_{\xi,\sigma}(y) = \begin{cases} 1 - \left(1 + \xi \frac{y}{\sigma}\right)^{-1/\xi} & \text{falls } \xi \neq 0 \\ 1 - e^{-y/\sigma} & \text{falls } \xi = 0 \end{cases}$$

with $y \geq 0$ if $\xi \geq 0$, and $y \in [0, -\sigma/\xi]$ if $\xi < 0$ ξ is called the shape parameter and σ is the scale parameter. The VaR at the confidence level α is calculated as Lhabitant (2003) shows for both approaches by:

$$\mathrm{VaR}_{\mathrm{BM}}(\alpha) = \hat{\mu}_n + \frac{\hat{\sigma}_n}{\hat{\xi}}\left[(-\ln(\alpha))^{-\hat{\xi}} - 1\right]$$

$$\mathrm{VaR}_{\mathrm{POT}}(\alpha) = u + \frac{\hat{\sigma}}{\hat{\xi}}\left(\left(\frac{n}{n_u}\alpha\right)^{-\hat{\xi}} - 1\right)$$

where n is the number of returns and n_u is the number of returns exceeding the threshold u.

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Mortgage-Backed Securities (MBS)

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Mortgage-backed securities (MBS) are financial instruments by which mortgages—a pledge of real estate to secure the loan originated for the purchase of that real estate—can be refinanced and distributed in the capital and money markets. Securitization, the process of pooling mortgages and converting them into packages of securities, transfers mortgages from the primary market, which encompasses transactions between mortgagors and mortgagees, to the secondary market, where MBS are frequently traded. The cash flows of the pools of mortgages can be channeled to investors in two ways: (1) they can simply be passed through to investors, after administrative or servicing fees are subtracted (pass-through securities), or (2) the cash flows can be allocated

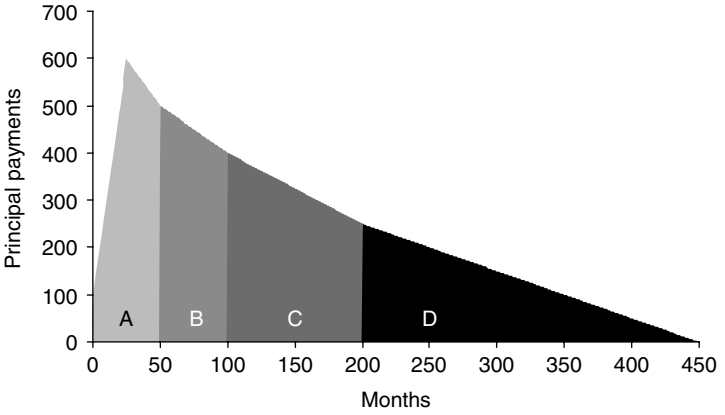

FIGURE 1
Principal payments to CMO bonds with a four-class sequential structure.

to investors according to specific rules, creating collateralized mortgage obligations (CMOs). As Stone and Zissu (2005) point out, despite their securitization, mortgage-backed securities do have the same risks as mortgages, the ordinary interest rate risk, the prepayment, and credit and default risk. The most common structure for MBS are pass-through certificates, which charter undivided ownership interests in the pool of mortgages. The undivided investment interest legitimates the owner of the security to a pro rata share of all interest payments and all scheduled or prepaid principal payments. In contrast to this, CMOs are structured so that there are different classes of bonds, which are called tranches, with varying maturities. By redirecting the cash flow from the underlying collateralized mortgages with rules for the distribution among the different tranches, issuers create classes of bonds that have different degrees of prepayment and interest rate risk. Normally all CMO tranches receive interest payments, but principal payments go first to senior class bonds until they are entirely repaid, and then to the next lower classes of bonds, which causes an asymmetrical allocation of prepayment risk as shown in Figure 1. The upper tranches (A and B) have shorter maturities and therefore lower prepayment risk whereas lower tranches (C and D) have longer maturities and therefore greater prepayment risk. Besides these sequential-pay bonds (see Figure 1), there are other types of CMO bonds such as planned amortization class (PAC) bonds, accrual (or Z) bonds, targeted amortization class (TAC) bonds, and floating-rate and inverse floating-rate bonds. Typically a single CMO tranche passes both interest and principal payments of the underlying pool of mortgages. However, interest-only (IO) and principal-only (PO) tranches divide the cash flow from underlying collateral that IO bonds receive no principal payments and PO bonds receive no interest payments. MBS issued by government-sponsored enterprises (GSEs)—Freddie Mac, Fannie Mae, or Ginnie Mae—are labeled agency MBS and have virtually no credit risk. In contrast, nonagency MBS, which typically are created from collateral that is nonconforming for the GSEs, do have a non-negligible credit risk which is normally reduced by external and/or internal credit enhancements.

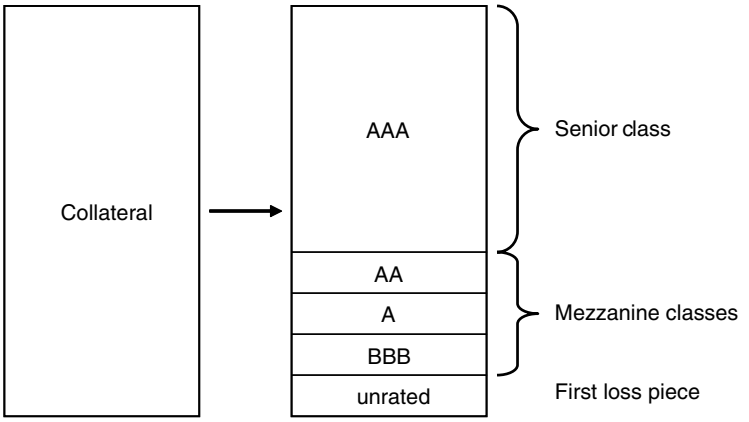

FIGURE 2
Typical subordinated structure for a nonagency CMO.

External credit enhancements are normally third-party guarantees such as a corporate guarantee, a letter of credit, pool or bond insurance, and offset losses up to a specified level. In contrast to this, internal credit enhancements come in more complicated forms and may alter the cash flows even in the absence of default. The various forms are subordination, reserve funds, excess spreads, and overcollateralization. Figure 2 displays a nonagency-subordinated structure, which is the most widely used internal credit enhancement. The subordinated tranche is the first loss piece absorbing all losses on the underlying collateral, thus protecting the senior tranches. Fabozzi (2005) provides an detailed overview of different form of MBS.

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Mount Lucas Management Index

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The Mount Lucas Management Index (MLM Index™) was created in 1988 by Mount Lucas Management Corp., headquartered in Princeton, New Jersey. The MLM Index™ comprises three liquid futures contracts baskets (commodities, currencies, and global bonds) consisting of 22 futures contracts:

- Commodities: copper, corn, crude oil, gold, heating oil, live cattle, natural gas, soybeans, sugar, unleaded gas, and wheat
- Currencies: Australian Dollar, British Pound, Canadian Dollar, Euro, Swiss Franc, and Japanese Yen

Global Bonds: Canadian Government Bond, Euro Bund, Japanese Government Bond, U.K. Long Gilt, and U.S. Ten Year Notes

The three subportfolios are weighted by the relative historical volatility of each basket. Within each basket, the constituent markets are equally weighted. The MLM Index™ serves as a benchmark for evaluating returns from managed futures and is designed as a trend-following index. It compares the price of a future versus its 12-month moving average. If the current price is above (below) its 12-month moving average, the index buys (sells) the futures contract. The index composition is rebalanced monthly and no leverage is employed. Mount Lucas Management Corp. replicates this index for a wide variety of investors via funds and separate accounts.

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Multi-Manager Hedge Fund

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A multi-manager hedge fund is an offering consisting of multiple fund managers. The offering may comprise managers within the same asset class or managers specializing in different markets and instruments. There are two main types of multi-manager funds: (1) fund-of-funds and (2) manager-of-managers. Fund supermarkets can also be considered as multi-manager products.

A fund-of-funds usually is structured as a limited partnership with the investment manager being responsible for performing asset allocation, manager due diligence, and manager monitoring. A fund-of-funds can be dedicated—focused on one style, such as relative value, event-driven, or even multi-strategy that focuses on a diversified exposure to several hedge fund categories. Hedge Fund Research (HFR), a Chicago-based index provider, has recently created a new database that groups fund-of-hedge funds by risk profile: conservative, diversified, market-defensive, and strategic.

Investing in a fund-of-funds provide several benefits. They offer instant diversification by investing in a number of funds and reducing idiosyncratic risk contributed by the individual funds. Studies of fund-of-funds demonstrate that a portfolio of five hedge funds can eliminate approximately 80% of the idiosyncratic risk of individual hedge fund managers.

Fund-of-funds facilitate access to hedge funds and for minimum investment of $1 million, investors can get access to a diversified portfolio of hedge funds that themselves usually have a $1 million investment minimum. Several fund-of-funds are listed on an exchange (e.g., Dublin, Frankfurt, London, and Zurich) and are members of clearing systems (e.g., Euroclear and Cedel; see Reynolds, 2005). The familiar trading and settlement processes through an exchange, as well as the greater perceived oversight and transparency, offer some investors increased comfort with this type of product.

Fund-of-funds offer "professional management and built-in asset allocation" (Jaeger, 2002), as well as access to closed hedge funds. Further, they are able to get better transparency by virtue of the size of assets they invest in underlying managers, as well as confidentiality agreements that give them timely access to underlying positions.

Some of the disadvantages of fund-of-funds are the additional layer of fees, and possibility of duplication or overdiversification. Fund-of-funds usually charge a management fee, in addition to the fee of underlying hedge funds, of 1–2% on assets, and a performance fee of 10–20%. Furthermore, they may hold offsetting positions or the same position in the underlying funds, diminishing the investment return to the investor. Fund-of-funds may offer more liquidity than the underlying funds and should have a liquidity buffer to meet redemptions.

A manager-of-managers assembles and sometimes seeds specialists, offering them a common trading and risk platform. The manager monitors the specialists' performance, engages in risk management at the aggregate level, and allocates risk capital depending on market opportunities and performance. A manager also can change the team in response to investor demand and market conditions.

A fund supermarket is a platform that offers multiple choices that have been prescreened but are not actively managed as a single offering and some even bundle funds by style or risk profile. Finally, investors have the advantage of some due diligence as well as obtaining their exposure through one supplier and receiving consolidated performance statements.

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Multi-Strategy Fund

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Hedge funds are loosely regulated investment funds that allow private investors to pool assets to be managed by an investment management firm. These funds are different from each other in their approaches and objectives, and hence they show varying levels of return and risk. The strategy of a hedge fund can fall under several categories such as tactical trading, equity long/short, event-driven, and relative value arbitrage, with equity long/short strategies being the dominant strategy as of 2006. An alternative to investing in a single-strategy hedge fund is the investment in a portfolio of hedge funds, a multi-strategy fund, to maximize return for a given level of risk. In this portfolio of hedge funds, called *funds of hedge funds* or *funds of funds*, an investor will have access to several managers and several investment strategies through a single investment. A small drawback of investing in FOFs is the second layer of management and performance fees that compensate for the FOF manager's expertise in identifying

the best hedge fund managers for the portfolio. To diversify the portfolio risk, a funds of fund manager—a multi-strategy fund of funds—may allocate investment capital to several managers with different strategies. In other words, a multi-strategy fund of funds incorporates various single strategies (not necessarily offered by the same organization) to diversify across strategies. A multi-strategy hedge fund can also be created by the various single-strategy hedge funds offered within the same organization. Through a multi-strategy fund, an investor can have higher returns and lower risk through strategy optimization (i.e., allocation of fund capital among strategies), can invest in hedge funds closed to new investors, can invest with a lower investment size, and can lower search/time cost of selecting the right manager/strategy at the cost of higher fees and possibly for moderate returns relative to a single-strategy fund.

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Municipals Over Bonds Spread (MOB Spread)

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The MOB spread, also known as the municipals over bonds spread, is the yield spread between municipal bond futures contracts and Treasury bond contracts with the same maturity. The spread is usually based on the bond futures contract closest to expiration, but with more than one month to expiration (Stanton, 2000). The development of the MOB spread is driven by the relative development of the two underlyings: municipal bonds and Treasury bonds.

Treasury bonds are noncallable debt instruments issued by the federal government with a maturity of more than 10 years. They pay interest twice a year and pay back principal at maturity. Contrary to municipals, Treasury bonds are considered free of default. Thus, the differences in expected returns come from differences in maturity, liquidity, tax implications, and tax provisions (Elton et al., 2006).

Municipal (muni) bonds, on the other hand, are often callable, and have tax-free interest (however, this is not the case for capital gains). Muni bonds are issued by cities, counties, airport authorities, or other nonfederal political entities. Generally, they are either obligation bonds backed by the credit/taxing power of the issuer, or revenue bonds backed by the financed project or the respective operating municipal agency (Elton et al., 2006).

Because munis are tax-free, they sell at lower yields than nonmuni bonds with the same risk and maturity. Thus, in order to compare munis with Treasuries, we must first estimate a taxable equivalent yield by comparing the discounted cash flows before-tax and after-tax. If the yield curve is flat and munis and Treasuries sell at par, the tax-equivalent yield can be approximated by dividing the muni yield by 1 minus the marginal tax rate (Elton et al., 2006). Consequently, changes in tax exemption rules will affect the performance of muni

bonds relative to Treasury bonds, as well as the MOB spread.

Interest rate shifts may also affect the MOB spread. For example, if interest rates fall, the muni bond issuer can call the bonds back and issue new ones at a lower interest rate. Thus the price of munis tends not to rise beyond a certain point. On the other hand, the price of Treasury bonds will increase as interest rates fall, because they are noncallable. Consequently, the MOB spread will generally decrease as Treasuries outperform munis, and vice versa (Stanton, 2000).

The sensitivity of the MOB spread to changes in interest rates depends on the makeup of the underlying index. This sensitivity increases with the time to maturity and the bond quality. Changes in the construction of the underlying will also result in changes in the MOB spread.

Betting on the spread is popular because it is relatively easy to predict. For example, it is easier to predict the relative development of changes in interest spreads because of consistent seasonal patterns of certain spreads. Predicting the general direction of interest rates is more difficult. And demand for tax-free municipal debt relative to demand for Treasury debt is more predictable because of the state taxation system (Teweles, 1999). Thus, if a trader expects muni bonds to outperform Treasury bonds, he will buy muni bond futures contracts and short Treasury bonds.

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N

Naked Options

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A naked option is an option that is written by the option seller with no underlying asset position in the portfolio to cover its risk exposure. This means that the option seller is purely speculating on the option, assuming a very risky position. Hence, naked options are also called uncovered options, as the seller has no underlying position to cover it. As the underlying asset starts rising call options follow the move. And, as the underlying asset has no theoretical limit to stop, the liability associated with the short call option position has no theoretical limit too. Therefore, a seller of a call option that has no underlying asset protecting the position has no theoretical loss limit. The same effect happens for put options, considering deep market falls. When shorting naked puts, investors assume a potential downside risk without any position to sustain the losses. As the market starts falling, the put option position starts incurring losses. Selling naked options is a very risky strategy that can be assumed in the options' market. Sometimes it is difficult to stop losses on naked positions, especially when the series where the seller has a position is far from-the-money (deep in-the-money or deep out-of-the-money). These series are usually very illiquid and it is sometimes difficult to close out an open positions. In these circumstances, it is advised to "close" the position using a different exercise price, creating a spread position instead.

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National Futures Association

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The Commodity Futures Trading Commission (CFTC) was created in conjunction with the Commodity Exchange Act of 1974 to regulate the U.S. futures markets (see Fung and Hsieh, 1999, for an evolutionary history of the legal environment of hedge funds). The CFTC is an independent federal regulatory authority with the legal responsibility to ensure that futures trading serves a valuable economic purpose, to guarantee the integrity of the market and the clearing process, and to protect the interests of futures market participants from market manipulation, misuse, and fraud. The CFTC is represented at the largest futures exchanges: Washington, DC (its headquarters); New York; Chicago; and Kansas City (http://www.cftc.gov/).

The futures industry attempts to regulate itself through an industrywide self-regulatory organization called the National Futures Association (NFA), which was formed in 1982 to establish and enforce standards of professional conduct. This organization works in conjunction with the CFTC to protect the interests of futures traders as well as those of the industry (for further details, see Edwards, 2006).

Every company or individual who carries out futures or options trading with the public is required to register with the CFTC and become a member of the NFA. The NFA's objective is to offer new regulatory programs and services making sure of futures industry integrity and to help its members in attaining their regulatory responsibilities. In order to ensure regular trading activity, the NFA conducts background checks on applicants, conducts exams and tests, ensures compliance regulations are met, and can impose sanctions on members if necessary.

The NFA's activities are overseen by the CFTC, on whose behalf the registration process is performed(for further details, see http://www.nfa.futures.org/). NFA members fall into four categories: (1) commodity trading advisors (CTAs), (2) commodity pool operators (CPOs), (3) futures commission merchants (FCMs), and (4) introducing brokers (IB). FCMs who are members of an exchange are subject not only to CFTC and NFA regulations, but also to the regulations of the exchanges and clearing organizations they belong to (see Figure 1). Therefore, the exchange and clearing corporation personnel are under the CFTC supervision and are accountable for scrutinizing the business conduct and assuming financial responsibility for their member firms, floor brokers, and traders.

Violating exchange rules can have serious consequences resulting in heavy fines,

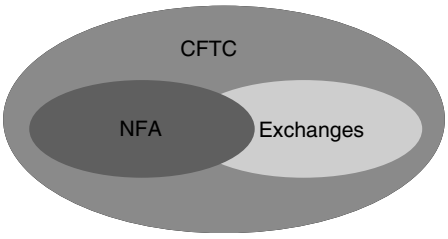

FIGURE 1
Regulatory relationship. (From NFA, 2006.)

suspension, revocation of trading privileges, and even the loss of exchange or clearing corporation membership. Even though the different regulatory organizations in the futures industry have their own particular areas of authority, jointly they form a regulatory partnership that watches over all industry members.

Once CPOs or CTAs have registered with the CFTC and the NFA, they are subject to several disclosure obligations (see Anson, 2006, for a survey). If a registered entity violates the rules, the NFA has the authority to take disciplinary action, which can range from issuing a warning for small rule violations to official complaints if rule violations merit prosecution. Penalties consist of censure, reprimand, expulsion, suspension, ban from future association with any NFA member, and fines up to $250,000 per violation. The NFA also has the authority to reject, suspend, restrict, or place conditions on any firm's or individual's registration (see http://www.nfa.futures.org/ and Edwards, 2003, for a detailed discussion).

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National Introducing Brokers Association (NIBA)

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The National Introducing Brokers Association (NIBA) was established as a not-for-profit association in 1991 (http://theniba.com). It is a nationally recognized organization focused specifically on retail professionals in the futures and options business (Schramm, 2005). Membership is open to all introducing brokers, commodity trading advisors, futures and options exchanges, futures commission merchants, and other futures registrants, vendors, attorneys, accountants, and others having an interrelated interest in the futures industry.

The goals and objectives of NIBA are to make sure the channels of communication remain open to individual members and between introducing brokers, futures commission merchants, and industry regulators allowing members to do better business and find greater opportunities.

NIBA offers training to members through regular meetings and conferences. Meetings with the National Futures Association and the Commodity Futures Trading Commission are usually held on a regular basis to discuss regulatory/policy issues. Membership permits right to use numerous privileges, as a number of vendors, suppliers, and resource providers to the industry offer reductions/discounts to members of NIBA toward their

products and services. The futures commissions members are an indispensable part of the organization because they give the board of directors suggestions and clarifications on all aspects from industry alterations to company policy and offer association news to members via newsletters and electronic communication systems. NIBA's main office is located in Chicago, Illinois.

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Natural Gas

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Natural gas is a gaseous fossil fuel. It is mainly used for heating in households and industrial processes, in power generation, and increasingly as raw material for chemical processes (e.g., fertilizer production). Transportation is either via pipelines or via liquefied natural gas (LNG) ships. Consequently, the delivery of natural gas is defined via hubs, where one or more pipelines or LNG terminals are connected to, for example, Henry-hub in the United States.

Demand for gas is mainly driven by weather, demographics, economic growth, and fuel competition. Additional price influence is given by storage and exports while the supply is mainly determined by pipeline capacity, storage, gas drilling rates, and weather events like hurricanes, technical issues, and imports. Natural gas consumption in the power sector is expected to grow in Europe as the shift from coal to gas is one of the many possibilities to reduce CO_2 emissions.

Gas is traded on exchanges, for example, NYMEX or ICE. Contract size at the NYMEX is 10 million British Thermal Units (btu) with a tick size of 0.001 USD per 10 million btu leading to a tick size of 10 USD per contract. The daily price limit is 3 USD per 10 million btu. Deliveries start at the first calendar day of the delivery month and end at the last calendar day of the month.

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Nearby Delivery Month

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In the context of options and futures, the nearby delivery month is the month closest to delivery, for futures, or to expiration, for options. According to Marshall and Bansal (1992), individual futures contracts are identified by their delivery month. Examples are "September corn" and "August T-Bills." To distinguish between two series, traders often refer to the sooner-to-deliver contract as the front month and the later-to-deliver contract as the back month. The sooner-to-deliver contract is often called the nearby contract. There is an interesting relation between the basis of a future contract and

TABLE 1

Quotes of the CME Lean Hogs Futures Contracts

Month	Last
July 2007	71.225
August	70.675
October	64.125
December	61.425
February 2008	65.2
April	67.05
May	72.5
June	73.2
July	72.25

the nearby delivery month (Dubofsky, 2003; Racicot and Théoret, 2006). As we know, the basis is defined as the spot price minus the futures price. There is a different basis for each delivery month of a futures contract. In a normal market, basis is negative because the cost-of-carry is generally positive. Basis would approach 0 as the delivery date nears. At the expiration of the futures contract, the spot price is equal to the futures price: basis is then 0. If this is not the case, there is an arbitrage opportunity. This process of the basis moving toward 0 is called convergence. The price of a futures nearby contract is thus near the spot price of the underlying. Table 1 presents the quotes of the CME lean hogs futures contracts as on June 29, 2007, from the nearby contract to the deferred.

According to this table and neglecting the expected basis, it is revealed that the futures market was expecting a fall of the hog price from July to December 2007. The price was expected to recover thereafter, hence this forecast is mean reverting. It is instructive to look at the quotes of the gold futures contract on the same day. In addition to being a consumption good like hog and oil, gold is also an investment good and is thus similar to a financial security. Hence, strict

TABLE 2

Quotes of the Futures Contract for Gold

Month	Last
July 2007	647.5
August	650.8
September	653.9
October	656.5
December	663
June 2012	835.7

deterministic arbitrage would hold for gold that is the following relationship between its futures price F and its spot price S: $F = Se^r$, r being the risk-free rate. As for pure financial instruments, the futures price of gold could not be used as a forecasting tool.

The spot price of an ounce of gold was \$647.5 on June 29, 2007, which is equal to the price of the nearby contract due to the convergence effect. In Table 2, we have omitted the prices of the contracts between December 2007 and June 2012. As revealed by this table, the futures price of gold increases continuously until June 2012, which is from the nearby contract to the deferred one. According to Table 2, the forecast return on gold would be about 5% yearly, a yield not very far away from the short-term interest rate in the United States. Therefore, there would be strict arbitrage between the spot price and the futures price of gold.

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Net Asset Value (NAV)

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The net asset value (NAV) measures the difference between an entity's asset value and the value of its liabilities. In terms of mutual funds and unit investment trusts (UITs), the NAV is usually calculated on a daily basis after the close of an exchange. NAV is equal to the market value of securities and of other assets owned by a fund, net of all liabilities, and divided by the total number of outstanding shares. For example, if a fund owns assets of $100 million and has liabilities of $20 million, its NAV is equal to $80 million.

In closed-end mutual funds there could either be a discount (premium) to NAV if a fund's market price is less (higher) than its NAV. This may be due to the investors' expectations on future performances. On occasions, mispricings may be persistent: this is the case of real estate mutual funds that cannot benefit from daily market prices to calculate their NAV (see Redding, 2006). In terms of companies, NAV is usually used as a synonym for company's book value and net worth. The calculation of an investment company's single share (i.e., the per share NAV) is usually calculated as total assets, less all liabilities and securities having a prior claim, divided by the number of outstanding shares. According to the above example, if we assume that the fund has 80 million shares outstanding, then the NAV per share is $1.

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Net Long

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Net long is a term used to describe when the value of an investor's long portfolio surpasses that of the short portfolio. However, an investor can also be net long any number of items, such as an asset, market, portfolio, or a particular trading strategy. An investor will take long positions in securities that they believe will increase in price over time and short positions in ones that will deliver negative returns. For example, a hedge fund that has 75% of portfolio weight in long equities and 25% in shorts is "50% net long." Ultimately this would result in directional exposure to equity market risk as the short portfolio would not be able to fully hedge the long portfolio (Lamm, 2004). A short portfolio can act as a hedge against market declines as well as provide alpha. More importantly, investors will vary the amount of net exposure as the market conditions change. For example, net long exposure of long/short equity hedge fund managers varied from very lofty levels in 1999 and 2000 during a period of soaring stock returns and to very low levels in 2002 when stock returns were downbeat (Lamm, 2004).

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Nondirectional

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Hedge funds strategies can broadly be characterized into directional and nondirectional ones. A directional strategy implies a bet anticipating a specific movement of a particular market, while a nondirectional strategy can be considered market-neutral. This means that nondirectional strategies have very little correlation with broad market indexes. Many hedge funds employ nondirectional strategies by going long in certain instruments and simultaneously short in others with the result that net exposure to overall market movements (e.g., a stock index, style factors, industry factors, exchange rates, interest rates) is close to zero. Broad classes of nondirectional strategies are long/short, arbitrage and relative value, and event-driven strategies (e.g., merger arbitrage).

Long/short strategies aim to identify undervalued and overvalued securities to set up a combined long and short position. As mentioned by Connor and Woo (2003), long/short portfolios are rarely completely market-neutral and often exhibit either a short or a long bias. Arbitrage and relative value strategies typically involve a perceived mispricing of related financial instruments. For example, convertible arbitrage involves a long position in convertible bonds combined with a short position in the underlying stock or bond.

While event-driven strategies are often categorized separately from market-neutral strategies, they typically involve little exposure to general market movements. The most popular event-driven strategies relate to investing in distressed securities and to merger arbitrage (see Lhabitant, 2002, for more details).

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Notice Day

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The day a clearinghouse can make a notice of intent to deliver stocks (commodities, indexes, etc.) to a buyer in fulfillment of (futures) contracts is defined as the notice day.

Additionally, we may mention that most initial public offerings (IPO) agreements include lockup provisions. These lockup provisions prohibit insiders from selling their shares for an agreed period (from 90 days to several years, usually 180 days) after the IPO. The requirements for the sale of the pre-IPO shares are defined by SEC Rules 144, 144(k), and 701. Numerous empirical studies examine the impact of lockup expiration on the stock price behaviour.

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Notice of Intent to Deliver

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When an exchange is developing a new futures contract it must specify the details of the agreement between the two parties. The exchange must specify the asset, the contract size (the amount of the asset that has to be delivered), the delivery location (the place where the delivery can be made), and the delivery period (the times when delivery can be made). For many futures contracts the delivery period is a whole month. Sometimes, there are also some alternatives for the quality of the asset and/or for the delivery location. When alternative qualities, delivery periods, or locations are possible, it is generally the party with the short position (the party that has agreed to sell the asset) that chooses among these alternatives. When the holder of the short position of the futures contract decides to deliver, he/she must present a notice of intent to deliver to the exchange prior to the delivery, which states how many contracts will be delivered and specifies the grade of the asset and the place of delivery (Hull, 2006). The exchange then assigns the notice and the subsequent delivery to one holder of a long position of the futures contract.

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Notional Principal

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A notional principal is a hypothetical predetermined amount that forms the basis of calculating payment obligations in derivative contracts, for instance, interest rate floor, cap, or forward rate agreement. Since the amount generally does not change hands, it is called notional. The notional principal is also referred to as the contract amount, reference amount, notional amount, principal amount, or notional principal amount.

In the following example, the notional principal is explained in the context of an interest rate swap (see e.g., Jarrow and Turnbull, 2000): Let us assume counterparty A commits to make fixed semiannual payments to counterparty B. The amount of each fixed payment from A to B is determined by a multiplication of the prespecified fixed rate of interest, for example, 4.5% per annum, by the notional principal:

$$\text{Payment}_{A\to B} = \frac{\begin{array}{l}\text{Notional principal}\\ \times \text{Fixed interest rate per annum}\\ \times \text{Days in period}\end{array}}{365}$$

In return, counterparty B agrees to make floating semiannual payments subject to the LIBOR. The amount of each floating rate-based payment is determined by a multiplication of the current LIBOR, for example, 3.75% per annum, by the notional principal:

$$\text{Payment}_{B\to A} = \frac{\begin{array}{l}\text{Notional principal}\\ \times \text{LIBOR per annum}\\ \times \text{Days in period}\end{array}}{360}$$

(For day count conventions, see Hull (2006, pp. 155–156).)

By assuming that there are 182 days in the particular period, and that the contract requires a notional principal of \$11 million, the payments are as follows:

$$\text{Payment}_{A\to B} = \frac{\$11{,}000{,}000 \times 0.045 \times 182}{365}$$
$$= \$246{,}821.92$$

$$\text{Payment}_{B\to A} = \frac{\$11{,}000{,}000 \times 0.0375 \times 182}{360}$$
$$= \$208{,}541.67$$

The payments are netted and A pays to B the net difference of \$38,280.25. The notional principal is not exchanged.

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O

Offering Date

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The offering date is the official date at which a company sells its shares on a stock market for the first time in an initial public offering (Ritter, 2003). Prior to the offering date, the company (with the help of its legal and accounting advisors, investment bank, and if applicable, venture capital and private equity investors) prepares a prospectus that is sent to the Securities and Exchange Commission (SEC) for a review. The rules pertaining to prospectus requirements are contained in the Securities Act of 1933. The prospectus requirement is set in place to protect the public against fraud. The SEC review process takes up to 2 months, during which time the company's attorneys are in contact with the SEC to make any necessary changes to the prospectus, and the company's financial statements are independently audited to ensure compliance with the SEC rules. During the SEC review period the company and its investment bank distribute the preliminary prospectus and carry out a road show to market the sale of the company's shares to potential investors. After the prospectus has been approved, the company's offering date is finalized, which is supposed to become effective 20 days after the final amendments to the prospectus are filed with the SEC. It is possible that the SEC may grant an acceleration so that the sale of share becomes effective immediately.

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Offering Memorandum

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An offering memorandum is a legal disclosure that provides potential buyers of a private placement with information relating to the objectives, terms, and risks of the placement. This disclosure protects the issuer from legal liabilities that may otherwise flow from nondisclosure, while simultaneously generating interest and reducing uncertainty in the placement. By increasing information and reducing uncertainty, the risk premium associated with the placement is reduced and a higher price is commanded. Sometimes called private placement memoranda, these equivalents to prospectuses in public securities satisfy securities regulations but typically do not substitute for the due diligence a buyer would exercise in their decision to purchase a private placement. However, since private placements do not have the same level of regulatory scrutiny, there is a heightened role of an offering memorandum in providing the information sought by potential investors. Since private placements typically attract experienced and diversified investors, the investor's reliance on the offering memorandum is typically less than would be the case in more arms-length, publicly traded new issues. Indeed, while the offering memorandum may provide the investor with the objectives of the enterprise, the prudent investor will usually conduct their own de novo analysis.

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Offering Price

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The offering price is the price at which an underwriter offers the primary and secondary shares to the public. The valuation of an IPO is a function of negotiations between the underwriter and the issuer. The offer price, therefore the market value of the company, determines the estimated proceeds of the IPO and the percentage of the firm that will be sold to investors (Loughran and Ritter, 2002). By the end of road show, the lead underwriter has an idea about the interest of the investors in the company. The assessment of the level of interest will assist the lead underwriter in determining the final offer price and the size of the offering. The offer price is characterized by the general economy, the performance of stocks of comparable companies already traded publicly, the firm-level information, and the status of the market as a whole (Kuhn, 1990). Underwriters play a crucial role in pricing the issue. The reputation of the underwriter is effective in terms of negotiation power for the offer price. High-prestige underwriters have extensive networks and are able to create a high demand toward issues. The degree of underpricing depends on the proper valuation of the offering price by the lead underwriter. The offer price can be easily modified

above or below the filing range to compensate for additional or insufficient demand for a stock (Hanley, 1993). While IPOs are frequently set outside the file range in the United States, IPOs are rarely priced outside the range in Europe and in Japan.

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Offering Range

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Price discovery is one of the most important functions of any stock exchange. In primary markets, this reflects the degree to which prior expectations, regarding the value of the offering, are revised in response to get feedback from investors and the market before the offer price is set.

Before the offer price is set globally, the issuer is required to file an offering range and issue size, which is used to calculate filing fees. The offering range includes the maximum and the minimum value an IPO can have once it will go public. The width of the offering range is an initial indication for the final value of the offer price. Higher offer price gives flexibility to the investment bank to set a price that fits more to the demand by investors and the information that has been revealed during the bookbuilding period.

Jenkinson et al. (2003) state that "significant information acquisition prior to the establishing of the indicative price range of European IPOs makes it more informative than the indicative price range for comparable U.S. IPOs." In addition, the authors state that the final price is firmly set at the upper end of the initial range in nearly 47% of European IPOs compared with less than 19% of U.S. IPOs. The reason for the European concentration at the higher end, even if the price range revision in Europe appears no more onerous than in the United States, seems to be the avoidance of some extra days for the revision of the issue.

Aggarwal et al. (2002) report that outside the United States only one-tenth of IPOs have a final price set outside the initial offer range. However, nearly 50% of all U.S. IPOs are priced outside the initial range. Most IPOs priced outside the filing range are the ones where significant information acquisition occurs during the bookbuilding period. Hanley (1993) assumes that issues with an offer price greater than the upper bound of the price range (disclosed in the issuing firms' preliminary prospectus) draw relatively strong institutional interest prior to the offering. The author reports that issues priced within the offer range draw moderate interest, while those offered at a price below the lower band of the offer range draw relatively weak interest prior to the offering.

Table 1 displays that Greece with a mean of 9.56% and Austria with 13.3% have attained the lowest width of price range in Europe. The reason for those low figures is the effort that underwriters in these countries are making to acquire credibility in the market. On the other hand, Italy and East European countries present higher than 20% width of price range.

TABLE 1

Initial Price Ranges, Offer Prices, and Underpricing

Country	Number of IPOs	Width of Price Range (%)[a]	Price Adjustment[b]	Proportion of Firms (%) Priced		Initial Underpricing (%)[c]	
				At Low End	At High End	Relative to Midpoint of Range	Relative to Issue Price
Austria	24	13.3	0.8	0.0	16.7	7.0	6.0
Belgium	45	15.6	1.6	6.7	37.8	24.7	22.4
France	178	14.3	3.0	9.6	42.7	18.9	14.6
Germany	219	16.1	4.8	7.8	71.7	57.1	48.9
Greece[d]	72	9.56	2.17	19.4	52.7	18.56	16.87
Italy	59	20.6	1.7	1.7	32.2	10.3	7.9
Netherlands	60	15.0	5.7	5.0	48.3	19.3	12.0
Spain	28	14.0	3.7	7.1	46.4	15.0	10.5
Sweden	35	14.0	0.0	11.4	25.7	4.4	4.3
Switzerland	25	14.2	2.4	8.0	28.0	8.2	5.5
United Kingdom	141	19.2	–0.5	5.7	20.6	10.6	10.2
Rest of West Europe	75	16.7	3.9	6.7	41.3	20.3	15.1
Rest of East Europe	29	20.0	1.4	17.2	34.5	21.0	18.7
Total Europe	918	16.3	2.8	7.3	43.7	25.4	21.1

[a] The width of the price range is measured as (high point − low point) × 100/midpoint.

[b] Price adjustment refers to the position of the final offer price relative to the midpoint of the initial price range.

[c] The measures of initial underpricing compare the end of first week market price to the midpoint of the initial price range, and also the issue price.

[d] From Gounopoulos (2007).

Source: Jenkinson et al. (2003).

Note: The table presents information on the initial price ranges, where the final offer price was set, and the initial underpricing for IPOs conducted using bookbuilding.

To change the offering range, Boehmer and Fishe (2001, p. 9) state that "… the issuer must file either pre- or post-effective amendments to the registration statement, and notify investors of the change. Pre-effective amendments are common in IPOs as the underwriter acquires more information about market demand, which lead to changes in the maximum price range or offer size. If these filings are confined to price changes, they are not likely to delay the effective or the public offers dates of the IPO. Post-effective filings, however, are more difficult because they may delay the public offering, which places more pressure on the issuer to complete the registration statement."

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Offset

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The purchase or sale of a futures contract does one of two things: It creates a new futures position or it cancels, eliminates, liquidates, closes out, or offsets an existing futures position. All of these terms mean the same thing. If a firm were long 100 March 2008 Eurodollar contracts, it could get out of or offset this position by simply going short 100 March 2008 Eurodollars. Note that the underlying asset (Eurodollars), the contract month (March 2008), and the size (100 contracts) must be the same. This is one of the features that distinguishes a futures position from a forward position—a futures position can be very easily undone by simply doing the opposite of what was done to create the position—buy if you previously sold, or sell if you previously bought.

There is a caveat. In the case of futures, you must offset your position at the same exchange where you initiated it, even if another exchange offers the same product. This is because each futures exchange has its own clearinghouse. So you cannot, for example, buy 50 crude oil contracts at NYMEX and sell 50 crude oil contracts at ICE Futures and expect the two to be offset. This is very different for those used to trading U.S. equity options, where you can create a position at one exchange and offset it at the other exchange. This is because all options exchanges clear at the same clearinghouse—the Options Clearing House, or the Options Clearing Corporation (OCC).

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Offshore Fund

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The offshore fund is a financial vehicle domiciled in an offshore jurisdiction. Offshore funds are usually kept outside a financial institution's country to benefit from an easier regulatory environment and a better tax treatment. In particular, offshore jurisdictions impose less or even no restrictions on a fund's investment strategy. This means that offshore mutual funds, placed outside the United States, do not have to comply with the burdensome U.S. Securities and Exchange Commission (SEC) rules, even though they are de facto managed in the United States.

Given the low- or even zero-tax rate, offshore funds usually offer significant tax benefits to investors domiciled in high-tax countries. For this reason, hedge funds operating in high-tax countries, such as the United States, usually set up offshore vehicles to raise capital from investors domiciled in high-tax countries (on this point see, e.g., Gross, 2004). Moreover, offshore funds allow tax-exempt investors, such as nonprofit entities and pension funds, to reinvest their tax-exempt capital gains in a low- or even zero-tax rate country. High-tax countries, including many EU countries, usually apply ad hoc rules aimed to contrast these benefits. In many cases, therefore, income distribution from these funds is taxed at normal rates, whenever repatriation occurs.

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Offshore Jurisdiction

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An offshore jurisdiction is a center for the establishment and management of both mutual and hedge funds, as well as of other vehicles. Offshore jurisdictions are usually characterized by mild financial regulation and usually offer privacy benefits, such as banking secrecy and anonymity. Proponents of offshore jurisdictions point out that these centers play a legitimate role in the international capital market, as they enable risk management, financial planning, and can improve market efficiency. Accordingly, Masciandaro (2006) shows that the probability to be an offshore jurisdiction is increasing in proportion to the degree of political stability and is negatively affected by crime level.

Critics of offshore jurisdictions maintain that soft regulation and anonymity can be exploited for illegal purposes, such as money laundering, terrorist financing, and tax evasion (see, e.g., Alworth and Masciandaro, 2004). Examples often cited by these critics are financial scandals that occurred in early 2000s, and, in particular, the Enron and Parmalat cases. Using special purpose vehicles placed in offshore jurisdictions these companies could manipulate financial statements. In recent years, international initiatives, such as the Financial Stability Forum (FSF) and the Financial Action Task Force (FACF), were undertaken to promote financial stability and enable information sharing. Moreover, since September 11, 2001, stricter rules aimed at scrutinizing United Nations embargoed persons have been implemented to prevent terrorist organizations from exploiting offshore jurisdictions. (See also Offshore fund and Offshore tax haven.)

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Offshore Tax Haven

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When an offshore jurisdiction offers not only favorable regulation and privacy but also a low- or even zero-tax rate, it is referred to as offshore tax haven. As argued by Alworth and Masciandaro (2004), there may be a close relationship between tax evasion and money laundering enhanced by offshore jurisdictions. In 1998, the Organisation for Economic Co-operation and Development (OECD) issued a list of tax havens, known as the black list, according to the so-called name and shame approach. The aim was to fight harmful tax practices. Since 1998, most offshore tax havens have aimed to dispel their evasion image and to improve information exchange. This improvement is indirectly supported by Dharmapala and

Hines (2007), who demonstrate that many tax havens are well-governed countries.

Nowadays, tax havens are much more attractive for tax planning rather than for tax evasion. In particular, they allow companies to avoid taxation in their host countries. In other words, a multinational company can set up a subsidiary in a tax haven to shift income, by means of financial strategies and other tax planning activities. For instance, a foreign subsidiary operating in a tax haven can borrow from its parent company placed in a high-tax country: as long as deductibility is allowed, the interest paid by the parent company to its subsidiary can reduce the overall tax burden faced by the multinational group. For other examples, such as the use of royalties and hybrid securities, see Altshuler and Grubert (2006). (See also Offshore fund and Offshore jurisdiction.)

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Omega

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Omega is a measure of the performance of a portfolio manager, similar to Jensen's alpha or the Sharpe ratio. The omega ratio, also called the Sharpe omega, is similar to the traditional Sharpe ratio used in portfolio management. However, it resorts to new concepts of risk that are measures of downside risk. Omega captures all the higher moments of a distribution of returns. There are numerous formulations for omega. The simplest one is $(\bar{x} - L)/P(L)$, where $\bar{x}$ is the expected return of the investment, L the threshold return targeted by an investor, and $P(L)$ the price of a put protecting from a drop of the return under L. Omega is an implicit measure of the risk of an investment. In other words, the numerator of the omega is the cost of acquiring the return over L and the denominator represents the cost of protecting the return from falling under L. The formula of $P(L)$ is given by $P(L) = e^{L-r_f} N(-d_2) - e^{\bar{x}-r_f} N(-d_1)$, where $d_1 = (\bar{x} - L + 0.5\sigma^2)/\sigma$ and $d_2 = d_1 - \sigma$. In addition, the period of investment is not really important to define this indicator of performance, so it is fixed to one period. Also, compared to the Black and Scholes formula, the actualization factor is no longer the risk-free rate but rather the excess returns over the risk-free rate of the threshold and the expected return of the investment; the returns thus incorporate risk. The price of this put is calculated according to the new theories of credit risk and is therefore not in accord with the traditional Black and Scholes world, which is risk-neutral. It is more akin to the initial warrant price formula developed by Samuelson or Bachelier's approach to option pricing (Kazemi et al., 2004).

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Omnibus Account

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An omnibus account is a large, aggregated, combined account used by financial intermediaries such as banks, brokers, and 401(k) administrators. This account, which became important in the 1990s, is shared between those intermediaries who aggregate their clients' orders into a single account and in this way offer them two major advantages. First, trade activity is shared in a single account from multiple participants, making it difficult to identify individual shareholder's activity, so protecting their individual identities (Levine, 2006). Second, these accounts have been largely exempted from redemption fees (Goar, 2004) and misused by some financial intermediaries. For example, this second point was combined for some 401(k) administrators with the advantages of the 401(k) plan to achieve exemption from redemption fees and to gain tax-free benefits. In this respect, the Securities and Exchange Commission (SEC), fighting for a transparent market, adopted Rule 22c-2 on March 2005, which imposes a fee if a fund redeems its shares within 7 days. In addition, it is very difficult and expensive for the fund industry to make this rule technologically feasible because each order for individual share trade information would need to be monitored. In particular, omnibus accounts would not allow aggregation of the dealings and present them at the end of the day as a single dealing because they must show each shareholder's identity and transaction information.

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One-to-Many

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One-to-many refers to a proprietary trading platform in which all participants are trading with a single universal counterparty. In other words, there is a single market maker and all participants in that market must trade with that market maker. That market maker, who typically owns and operates the platform, posts bids and offers that can be traded on by all eligible participants in the market. One-to-many facilities are essentially bilateral dealer markets and are not considered to be trading facilities under the Commodity Exchange Act. This universal counterparty, because it sees the activity and positions of all other participants, has a substantial information advantage over the other participants.

The most famous one-to-many market was Enron Online (EOL), which was launched on November 29, 1999, and eventually traded roughly 850 commodities, though the most active trading was in natural gas and electricity. EOL operated pursuant to the exemption in Section 2(h)(1) of the Commodity Exchange Act, exempt

from all provisions of that Act except the prohibitions against fraud and manipulation. On EOL, there were no commissions and real-time prices were free. Enron made its money off the bid/ask spread. It was so much easier to use than traditional trading because it replaced the phone and fax with a mouse click. Initially volume grew rapidly. However, because of the abuses that took place on EOL during the significant manipulation and abuse of California energy markets in 2000 and 2001, the Federal Energy Regulatory Commission in its *Final Report on Price Manipulation of Western Markets* recommended that one-to-many markets like EOL be prohibited. EOL shut down on November 28, 2001, 2 years after it began and 4 days before Enron filed for bankruptcy.

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Open Interest

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Open interest is defined as the number of options or futures contracts that are held by market participants at the end of each trading day. As a general rule, the larger the open interest and larger the trading volume, the greater the liquidity of the contract. Investors and traders prefer larger volume and larger open interest, as the contracts become less expensive to trade and larger positions can be entered or exited more quickly. Volume may not necessarily translate directly to a change in open interest. In a market dominated by traders who hold positions for less than 1 day, there may be large trading volume without a significant increase in open interest. However, nearly all volume may lead to an increase in open interest in contracts where traders choose to hold open positions for a longer period of time.

All futures and options contracts start with zero open interest, that is, where no traders have any positions when the contracts are first listed. Assume a first trade where a buyer purchases 10 contracts and a seller sells 10 contracts. After that trade, there is a total open interest of 10 contracts. This means that open interest measures the number of contracts held long, or the number of contracts held short, but not the sum of the number of long and short contracts. To combine the number of long and short contracts would overstate the open interest in the listed market. In subsequent trades, open interest increases when new contracts are traded, but not when existing contracts are transferred from one investor to another. For example, assume that the buyer of the long position decides to sell her 10 contracts to a new investor. This transfer of existing contracts does not increase the open interest. However, if she purchased those 10 contracts from a new seller in the market, the open interest in that contract would grow to 20 contracts. Open interest at the expiration of the options or futures contract is zero, as all contracts must be settled for cash or physical settlement at the termination of the life of the contract.

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Open Outcry

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When a customer places an order with his broker, the broker phones (or uses an order routing system to inform) the firm's trading desk on the exchange floor, who then relays the order to the firm's traders in a trading pit where the contract trade. At the trading pit, hand signals and verbal activity are used to place bids and make offers. This process is called open outcry.

The concept of open outcry arose from the early days of trading through auction and is a 140-year tradition. Traders stand in designated areas, called "trading pits," on the trading floor. Every trader in the pit is an "auctioneer." Each trader announces his own bids and offers. Special hand signals indicating buying or selling, price, and quantity are used.

In the open outcry system, there is a well-established system underlying an outward appearance of apparent chaos. In this system, only the "best" bid and offer are allowed to surface in the trading pit. For example, if a trader is willing to pay a higher price, he or she will announce the bid, silencing bids that are lower. Further, when a trader announces a bid, he or she states the price first and the quantity next, such as 98.35 (price) on 2 (quantity). For an offer, quantity is stated first followed by price, such as 1 (quantity) at 98.36 (price).

While the open outcry process is slowly becoming outdated, it is used in the United States and some exchanges overseas like the Singapore Exchange. Most futures exchanges outside the United States use a fully automated system when orders are submitted through a computer and executed off the trading floor.

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Open Trade Equity

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Open trade equity is the unrealized gain or loss on an open position. The gain or loss for a position is the difference between what you paid for the asset (cost) and its current market value. For example, if you bought 100 shares of stock for $50 per share, your cost would be $5000. If the stock is trading for $60 in the market, your position is worth $6000 or an unrealized gain of $1000. Consequently, if the shares are trading at $40, your position is worth $4000 and you have an unrealized loss of $1000. As long as your position is still "open," meaning you still own them, the profit/loss will continue to be unrealized. Once the positions are "closed," meaning that you sold them, your profit/loss is now realized. The open trade equity in a futures account is settled every day. This is referred to as "marking to market." The investors' margin or cash account will be credited or debited at the end of every

day based on your position in the market. Even though the addition or subtraction of cash is settled daily, trades will usually not realize the net gain or loss until they "leave the market" or close out their position.

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Opening Premium

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The opening premium is the difference at the initiation of trading between the opening price and the valuation of an initial public offering by analysts and the listing investment bank. An initial public offering may have no record of earnings or little or no fixed asset value. As a consequence, the initial valuation of such a public offering must capture the value of goodwill inherent in the enterprise. The resulting initial valuation is used to develop an expectation of the trading range of the newly issued security once trading commences. If the initial public offering initiates trade beyond the range specified, it is trading at a positive opening premium. This premium could also be negative if the market does not accept the analyst's valuation.

Certain initial public offerings can attract significant attention, especially if they are listed in a seller's market for IPOs. Hence, the opening premium can be affected by the overall market mood, the level of interest and competition in other new issues, and the market confidence in the analyst's projections. In addition, some investors may be able to secure the new issue at a fixed price, determined in advance of the listing. The opening premium can create for these investors an instant profit per share, equal to the opening premium once the security is issued.

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Opening Range

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The opening range is the interval of prices defined by the lowest and the highest price at the opening of the market. Many exchanges begin trading each day with an opening call for each contract. The opening call allows traders some time to orderly post their initial bids and offers before continuous trading may begin. After this period of orders posting, also known as preopen trading, and based on the traders orders, some trading actually takes place and allows the establishment of an opening range for prices as well as the actual prices and quantities traded. If only one price was recorded during the opening, the space for the opening high is typically left blank.

TABLE 1

Opening Ranges at CBOT

Underlying Expiration	Soybean Pit	Corn Pit	Oats Pit	Wheat Pit
July 2007	[861'0, –]	[327'0, –]	[290'0, –]	[568'0, 570'0]
August 2007	[866'0, –]			
September 2007	[871'0, –]	[336'0, 338'0]	[267'0, 267'2]	[580'0, 581'0]
November 2007	[892'0, 892'4]			
December 2007		[345'4, 347'0]	[267'0, 267'2]	

CBOT Opening ranges for Soybean/Corn/Oat/Wheat Futures with maturities in 2007. Open quotes for 3rd of July 2007.
Source: Dow Jones & Company, Inc.

When trading is made through an electronic platform, the trading host sends a market mode message to all the participants who have subscribed to a market indicating that preopen has started. During preopen trading, market participants can submit, revise, pull orders, and create strategies, but the type of orders are many times restricted. Many exchanges allow only for a special order type called market open order. If trading in actually made on the floor of the exchange, a separate opening call is held in each pit for each delivery date in succession before continuous trading begins (Table 1).

Besides the daily preopen trading, some contracts can also go into preopen during market hours. This occurrence is rare but may happen prior to the release of price sensitive information concerning the underlying to a futures contract. It allows every market participants a period of time to assimilate the information and enter or alter orders onto the market.

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Opportunistic

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Opportunistic behavior (opportunism) is understood as self-interest seeking behavior and involves the identification and exploitation of beneficial (pecuniary or nonpecuniary) opportunities, such as investment opportunities or the opportunity to gain decision-making powers. When opportunism is described in the context of the new institutional economics, the idea of self-interest maximization is commonly complemented by some form of guile or deceit, such as distorting or withholding information when entering into a contract to mislead or confuse the opposite party to the contract, or hiding actions after the conclusion of the contract.

Irrespective of any possibly guileful or deceitful behavior, hedge fund investing is opportunistic in two ways. First, hedge funds complement an investor's existing investment opportunity set, because by investing in a hedge fund the investor receives the opportunity to benefit from investments in assets, for example, late stage private investment,

or from investment strategies such as short selling that previously were not obtainable. Second, most hedge fund strategies explicitly involve the identification and exploitation of profitable single investment opportunities such as arbitrage opportunities, event-driven opportunities, or timing opportunities. The identification of profitable investment opportunities is only possible when the hedge fund portfolio manager has superior skill and/or superior information compared to other investors. Opportunistic hedge fund strategies are not necessarily restricted to particular investment styles or asset classes.

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Optimization

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Optimization, in general, means working out the values of a set of variables that returns the stated extremum of the objective function while satisfying the constraints imposed over the variables. Optimization techniques are applied to many different areas, including finance. In finance, the objective is to find the optimizing values of the variables to have the highest expected return and lowest risk. Portfolio management is a fundamental activity of all economic agents. The optimization problem of the portfolio manager can be expressed in two equivalent ways: The investor, assumed to be constantly rational in making decisions, is supposed to find the greatest expected return portfolio with the given risk or the lowest risk portfolio with the given expected return. These two problems are called *duals* and yield exactly the same solution set of variables. The optimization problem has many different forms: the objective may be minimization or maximization, the constraints may be linear or nonlinear, the constraint may be "less than" or "greater than" type, etc. The following formulation of the problem can be manipulated to include all cases:

$$\begin{aligned} &\underset{x \in R^n}{\text{Minimize}}\, F(x) \\ &\text{subject to} \\ &c(x) \leq u \end{aligned}$$

In this formulation F is the objective function and $c(x) \leq x$ is the set of constraints. If a portfolio is selected in case there is another portfolio with a greater return and the same level of risk, then there is inefficiency. The set of all efficient portfolios (portfolios that have the lowest risk for any given return) constitutes the efficient frontier. Portfolios off this frontier should not be considered for investment.

Markowitz (1952) pioneered the study of the portfolio optimization problem and developed the "mean–variance approach" with the main assumption of normality. He was awarded the Nobel Prize in 1990 for his contribution to finance theory. This approach is still very popular and is applied by financial institutions. Although Markowitz's analysis was remarkable, it is being criticized because of being static and the unrealistic assumption of normality. The investor is not given a chance to update the

portfolio until the end of the period, which is not realistic. This unrealistic assumption should lead to the opportunity cost of the better strategies possible. The investor requires a model for such shifts of portfolios since the volatility of prices is high and the conditions are changing through time that requires working out the portfolio optimization problem on a continuous basis. At least Markowitz's original work should be expanded to handle multiperiods. Another Nobel Laureate Merton (1971) recognized this and updated the optimization problem to the continuous case.

The optimization problem of hedge funds is an extension of the portfolio optimization. What is specific to this optimization problem is the expression of risk. For instance, Favre and Galeano (2002) achieve the mean-modified value-at-risk optimization with hedge funds. Duarte (1999) includes a short list of measures for risk and claimed that Markowitz's study is a special case of his work. The list constitutes mean variance (MV), mean semivariance (MSV), mean downside risk (MDR), mean absolute deviation (MAD), mean absolute semideviation (MASD), and mean absolute downside risk (MADR). There are several online Internet services that help investors find the best portfolio, based on their preference of risk measure.

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Option Buyer

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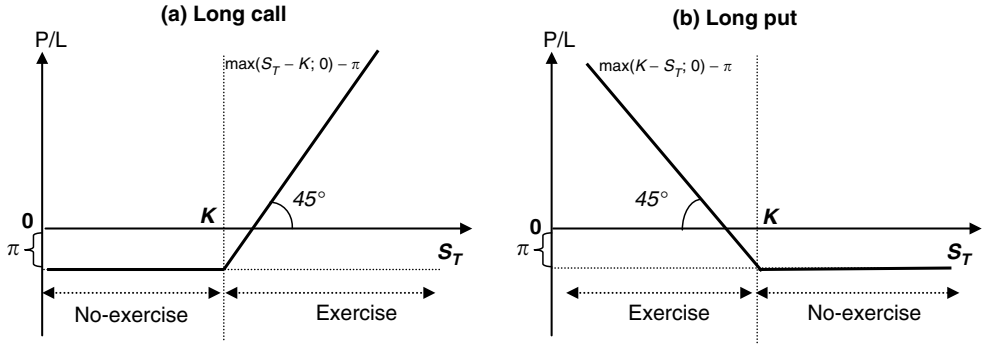
An option buyer has the right but not the obligation, either to buy (call option) or to sell (put option) the asset at a predetermined level fixed by the exercise price. A call option buyer searches for protection against a rise in the asset price. At expiration, she would use her right if the spot price is above the strike price. On the contrary, a put option buyer tries to protect herself against a fall in the asset price. At expiration, she would use her right if the spot price is below the strike price.

To get these advantages, an option buyer has to pay a premium, which is determined at the time she buys the option. The premium is the price of the option. Option prices differ largely depending on the maturity, the moneyness, and the type of the option. In general, long dated options are more expensive due to their larger time value. Moreover, in a large number of markets, deep out of the money put options, which protect its buyer against a drop in price, are richer than out of the money call options, which protect its buyer against a surge in the asset price. This reflects the fact that people are more willing to pay insurance against catastrophic events.

For a call option buyer, the payoff at expiration is given by $\max(0, S_T - K) - \pi$, where π stands for the premium, S_T is the asset price at expiration, and K is the strike price. For a put option buyer, the payoff at expiration is given by $\max(0, K - S_T) - \pi$. In both cases, this implies that losses are limited to the payment of the premium while gains are potentially unlimited. See the following figures.



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Option Contract

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An option contract is a financial instrument that gives the holder of the contract the right, but not the obligation, to buy or sell an underlying asset at an agreed upon price for a future date. Like futures and swaps, options are also examples of derivative products. There are two basic option types: a call option gives the holder of the contract the right to buy the asset, whereas a put option gives the holder the right to sell the asset. As in every contract, there is also a seller/writer of the call or put options. The writer of an option contract may be trying to hedge the risk from another contract or he/she may be trying to profit from future price changes based on his/her future expectations. The price that an option writer receives is known as option premium. The price in the option contract is known as the strike or exercise price. The date the contract expires is called the expiration or maturity date. Options are either traded in organized exchanges or in over-the-counter (OTC) markets. Option contracts can also be categorized as American or European options. American options could be exercised at any time prior to the expiration date, while European options could only be exercised at the expiration date. Options on assets other than stocks and currencies are also widely traded. There are options on market, industry, stock indexes, prices of future contracts, metal products, fixed-income securities, etc.

For a call option, if the spot price at the expiration is equal to the strike price (for a European option), option will be at-the-money, indicating that the option holder do not gain or lose by exercising his/her rights. On the other hand, if the strike price is less than the spot price, option will be in-the-money, indicating a positive gain from the option exercise. For an out-of-the-money option, strike price will be larger than spot price. An out-of-the-money option will not be exercised by the contract holder, and the direct loss will be limited to the option premium paid to the option writer. A call option has potentially unlimited gain if the strike price is less than the spot price. Similarly, for the holder of a put option, the contract will

be in-the-money if the spot price is lower than the strike price, providing potentially unlimited gain from exercising the option.

Consider a trader who bought a call option for the delivery of 125,000 euros in 90 days at a strike price of $1.3500 for an option premium of $0.0157 per euro. The cost of holding the contract is equal to $1962.50. If the spot price is $1.3650 next day, for an American option holder, option exercise will lead to a gain of $1875. However, since this is less than the option premium paid, owner of the option will have no intention to exercise the option. If the spot price at the expiration is $1.3350, option will be out-of-money and the holder will prefer to let the option expire. The cost to the holder will be the option premium paid, which is also the gain to the option writer. On the other hand, if the spot price at the expiration date is $1.3700, exercising the option will create a gain of $537.50, net of the premium paid. As it is clear, the writer of the call option faces with a potentially unlimited liability. Break-even price for the option is equal to $1.3343 and represents the spot price where the holder is indifferent between exercising or expiring the option.

There are basically six factors that affect option prices. These are (a) the current spot price, (b) the strike price, (c) the time to expiration, (d) the volatility of the price of the underlying asset, (e) the risk-free interest rate, and (f) the dividends expected during the life of the option (for stock options).

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Option Premium

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The option premium is the price that is paid to buy an option. This price results from the demand and supply in the option market. In an arbitrage-free world, that is, in the absence of market frictions such as direct and indirect transaction costs, the option premium will represent the true value of the option. However, the real-world option premium may divert from the true value. The divergence may be particularly high for over-the-counter (OTC) options and for real options, because market mechanisms can hardly be applied to these types of options. In order to determine the true value and to assess the deviation of the actual option premium from the true value, an option pricing model, also called option valuation model, is applied. Despite some recent development of alternative option pricing models, the most widely used and discussed option pricing models are based on the application of a pricing tree, such as a binomial tree as proposed by Cox et al. (1979) or a trinomial tree, or they are based on the Black–Scholes model—sometimes referred to as the Black–Scholes–Merton model—as developed by Black and Scholes (1973) and Merton (1973). The Black–Scholes model is typically used to determine the value of European options, whereas the pricing of American options and, in particular, of exotic options requires the application of other models such as pricing tree models.

The value of an option and, analogously, the option premium are typically influenced by six factors: the spot price of the

underlying asset, the exercise price, the time to expiration, the volatility of the price of the underlying, the risk-free rate, and expected payments from the underlying before expiration. An option becomes more valuable when its intrinsic value, that is, for call options the excess of spot over exercise price and for put options the excess of exercise over spot price, increases. Consequently, the value of call/put options increases when the spot price increases/decreases, and call/put options with a lower/higher exercise price are more valuable than those with a higher/lower exercise price, respectively. The influence of the time to expiration may differ between American options and European options. An American option with a longer time to expiration has an at-least-as-high value as a short-life American option, because it offers additional exercise opportunities compared to an otherwise equally endowed short-life option. Since European options may not be exercised prior to expiration, a significant payment from the underlying before expiration that causes a spot price decline of the underlying may offset the possibly higher time value of a long-life European call option. Due to its nonlinear payment structure, the value of an option increases when the volatility of the price of the underlying increases, because higher volatility implies higher probability of extreme spot price changes. The holder of a put or call option faces limited downside risk from the option position. However, an extreme spot price movement that leads to a far-in-the-money option position strongly increases its intrinsic value. The influence of the risk-free rate cannot be unambiguously determined because it strongly depends on the price sensitivity of the underlying to interest rate changes. As indicated above, a payment from the underlying, such as a dividend payment, tends to decrease the spot price of the underlying. Therefore, an expected payment typically decreases/increases the intrinsic value of a call/put option.

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Option Seller

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An option seller, also known as an option writer, gives the option buyer the right either to buy (call) or to sell (put) the asset at the exercise price. This gives the option seller some potential future liabilities against which he/she receives some cash up front equivalent to the price of the option. The option seller's profit or loss is the reverse of that of the purchaser of the option. More precisely, at expiration of the contract, the payoff of the call seller is $\pi - \max(0, S_T - K)$ and the payoff of the put seller is $\pi - \max(0, K - S_T)$, where π stands for the premium, S_T is the asset price at expiration, and K the strike price. If the stock price increases, the call writer faces potentially unlimited losses. The same applies to the put writer, whenever the stock price falls (Figure 1).

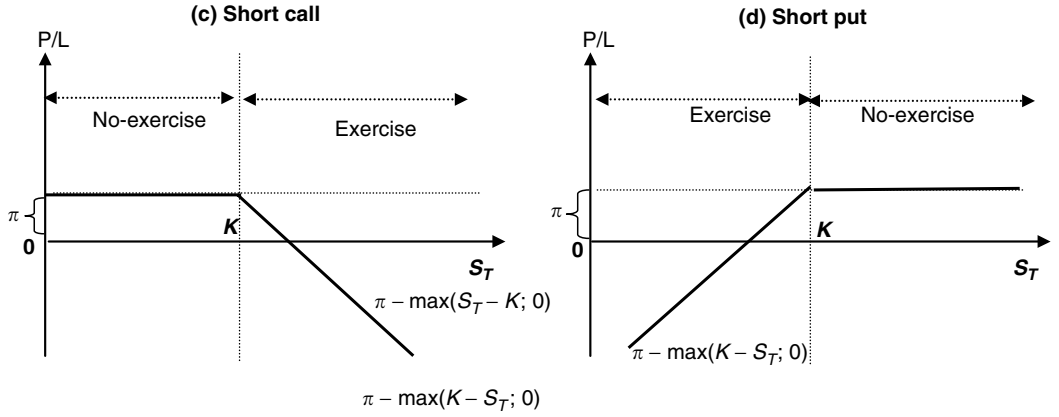

FIGURE 1
Option selling.

While it might seem at first glance that the position of the option seller is very disadvantageous, market practice seems to indicate that most of the time it is profitable to write options on the market. This is particularly the case for out-of-the-money options that are the most heavily traded, meaning that option buyers pay too expensive insurance premiums against catastrophic events. Broadly speaking, the profitability of option writing corresponds to the positiveness (on average) of the difference between implied volatility—which is paid by the option buyer—and realized volatility—which is paid by the option seller.

There have been several academic studies on the profitability of this trade. For instance, Bondarenko (2003) estimates that systematically writing at-the-money 1-month maturity puts on the S&P would have led to an average excess return of 39% per year from August 1987 to December 2000, with huge Sharpe ratios; although one should take care that the Sharpe ratio might not be a sensible measure due to the huge tail risk (extreme losses) involved in writing puts (Goetzmann et al., 2002). Writing calls on the market appears less risky and some authors have identified that it can also be profitable, notably when combined with a long position in the asset (Whaley, 2002) or when realized on single stocks rather than on the index (Bollen and Whaley, 2004).

Inspired by these results, the CBOE has recently launched two indices, which track the value of systematic option writing on the S&P 500 index (http://www.cboe.com/micro/IndexSites.aspx). The BXM index is applying a buywrite strategy, also known as a covered call, which implies buying the underlying and simultaneously shorting at-the-money 1-month maturity calls. The backtesting shows that over the period 1988–2006, the strategy would have posted the same performance as a simple long position in the S&P but with a volatility reduced by a third. CBOE has extended the strategy to other moneyness and to other indices (Nasdaq, Dow Jones Industrial Average, Russell). The PutWrite Index is designed to reproduce the payoff of a sequence of sales of 1-month, at-the-money, S&P 500 index puts while cash is invested at 1- and 3-month Treasury bill rates. Historical backtesting shows that the strategy would

have outperformed simple long positions in the S&P 500 index by 50 basis points per year while the volatility of the strategy is only 60% of the index's one. Investable versions of these indexes have been made available by investment banks or asset managers.

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Options

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Options are contingent claims that can be exercised under specific conditions. By contingent it means two things:

a. Although the holder may have the right to exercise the option, its exercise, under economic rationality, depends upon the observation of a certain set of conditions.
b. The value of the option also depends on the observation of the same set of conditions.

An option is usually set between two counterparts through a written agreement called *option contract*. The written contract sets a certain number of conditions and establishes the contractual form of the option.

Among the conditions established in the contract there are a certain number of characteristics that should always be specified:

- The underlying asset on which the option is built
- The maturity date of the option, that is, the final date when the option holder may exercise his right
- The exercise (strike) price for which the holder has the right to buy or to sell the underlying asset to the option writer
- The style of the option (if the option is American style, the holder can exercise the option at any moment in time until maturity, and if the option is European style, the holder can only exercise his right at maturity)
- The unit of trade, that is, the quantity of underlying asset that is under one option contract.

Options can be traded in options' exchanges or over-the-counter (OTC). When options are traded in an exchange under a set of regulations, they are called *traded options*. Traded options are standardized contracts where the main contract specifications are standardized and not customized. Among the main options exchanges in the world we have the Chicago Board Options Exchange (CBOE), the American Stock and Options Exchange (Amex), the Philadelphia Stock Exchange, the NYSE Euronext Liffe, and the Eurex (the last two in Europe).

There are two option types: calls and puts. A *call option* gives the holder the right, but

not the obligation, to buy a certain asset by a specified priced, on or until a certain date. A *put option* gives the holder the right, but not the obligation, to sell a certain asset by a specified priced, on or until a certain date. For instance, in NYSE Euronext Liffe, one equity call option contract on British Airways entitles the holder the right to buy 100 British Airways shares until maturity by a specified price. These NYSE Euronext Liffe equity options are American style.

In CBOE, an equity put option contract on General Motors conveys the holder with the right to sell 100 General Motors shares until maturity by a specified price. These options are also American style. When the option is traded the option buyer pays a specified amount to the option seller called *premium*. The premium is then the amount of money that ties the option seller to the counterpart liability if exercised by the option buyer.

When options are trade OTC, they are called *OTC options* and contract specifications can differ and contract characteristics can be customized. We may set a different exercise price, or a different maturity date, for instance. We find traded options on a wide range of products and instruments, such as shares, bonds, stock indices, currencies, futures contracts, etc.

Although it is common to refer that the first reference to options is found in the biblical description of the Jacob and Rachel love story, in fact, the first piece of financial literature on the subject is found in Joseph de la Vega, a Portuguese Jew, living in Amsterdam in the XVII century. After escaping from Portugal to avoid the Portuguese Inquisition, and after being familiar with the stock and options trading activity, he wrote a book called *Confusion de Confusiones* where options and its trading is carefully explained (see Cardoso, 2002, for details).

With the seminal papers of Black and Scholes (1973), Merton (1973), and Cox et al. (1979) option valuation became one of the major achievements in finance. Today, option theory is a fundamental base in helping the development of the financial industry, supporting the creation of new financial instruments and serving the valuation of companies and projects.

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Order Book

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The order book can be defined as a record of orders maintained by the underwriters (the specialist or the investment bank). A book building is generally used to market initial public offerings to investors. Following the original studies led by Benveniste and Spidt (1989) and Benveniste and Wilhelm (1990), this process consists in three steps. First, the

investment bank invites selected investors to evaluate the issue. Second, after evaluation of the issue, selected investors inform the bank of their preliminary demand. Third, the investment bank prices the issue and undertakes the allocations of shares to investors.

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Out-of-the-Money Option

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An out-of-the-money option is one for which the price of the underlying is less than the strike price. For instance, the payoff of a call is equal to $\max(0, S_T - K)$, where S_T is the price of the underlying at maturity and K the strike price of the option. This option is out-of-the-money if $S_T < K$. It expires unexercised in this case. The liquidity of the out-of-the-money option markets is generally high because these options are in great demand for hedging strategies purposes. When we relate the implicit volatility of out-of-the money options to their degree of moneyness, that is, the ratio of the strike to the price of the underlying, we notice what is denoted a smirk. Let us notice that implicit volatility is associated to an option pricing model. It is often computed using the Black and Scholes model and it is obtained by using the Manaster and Koehler (1982) iterative procedure, which is based on the Newton–Raphson search procedure. In this procedure, we have to guess an initial volatility given by $\sigma_0^\star = [|\ln(S/K) + \text{rf} \times T| \times 2/T]^{1/2}$ to incorporate in the following iterative procedure: $\sigma_{i+1}^\star = \sigma_i^\star - [(C(\sigma_i^\star) - C)\exp(d_1^2/2)\sqrt{2\pi}/S\sqrt{T}]$, with an obvious notation. In this expression, C is the quoted price of the European call option and $C(\sigma_i^\star)$ is the price of the call obtained by substituting $\sigma_i^\star$ in the Black–Scholes formula. The smirk is related to the skewness and the kurtosis of the distribution of the returns of the underlying. Negative skewness and positive kurtosis tend to give way to a smirk. The smirk is also due to the high demand of out-of-the-money options for hedging activities purposes. In addition, very out-of-the-money options have very low Greeks, that is, their delta and gamma are quite low and their probability to be left unexercised is very high (Cuthbertson and Nitzsche, 2001; Racicot and Théoret, 2006; Rouah and Vainberg, 2007; Wilmott, 2001).

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Out Trade

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The day after the market trades, the exchange's clearinghouse makes an attempt to match the buy and sell orders of the previous day's trades; the clearinghouse must match the paperwork for both sides of the transaction. An out trade will occur when the paperwork for both sides of the trade disagrees on certain details of the trade. Examples of trade discrepancies may include the following: the type of order (either buy or sell), underlying security, the execution price, or quantity. The exchange will work to resolve the information miscommunication between the various parties (Kolb, 2000). Out trade notices are generated by the clearinghouse, which documents the details of the unmatched information between the two parties, and then out trade sessions may be held by the various exchanges to ensure the resolution of all current out trades. If out trade discrepancies have not been resolved by the clearinghouse and the associated counterparties to the trade within a specified time period, then the trade is classified as "busted" and is not recognized as valid. Once the trade matches, the exchange guarantees those traders whose contracts have increased in value and collects money from those whose contracts have decreased in value (Levinson, 2006).

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Overallotment

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During IPO, to cover oversubscription for new securities issued, the underwriter is granted an option for a limited period of time to purchase additional securities from the issuer at the issue price (usually 15% of the offering amount). This common feature of the IPO market is also referred to as a greenshoe option and is considered as a price stabilization mechanism. Aggarwal (2000) finds indeed that "underwriters manage price support activities by using a combination of aftermarket short covering, penalty bids, and the selective use of the overallotment option." Ellis et al. (2000) also find that the lead underwriter uses the overallotment option for less successful IPOs to reduce his inventory risk. Cotter and Thomas (1998) examine the ways underwriters use the overallotment option and find that underwriters always profit when they make full use of the overallotment. They also suggest that the Nasdaq should reexamine the size of the

overallotment options and require disclosures concerning their uses.

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Overbought

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This refers to the situation in which the demand for an asset has increased to such an extent that it has pushed the asset price to a level that no longer supports its fundamentals. In such a case, the asset is considered to be overvalued. Consequently, a market correction will almost certainly occur, with the logical result of a decrease in its stock price (Colby and Meyers, 1992).

Overbought is a term used by technical analysts. This is because technical indicators and oscillators are mathematical, statistical models, which express graphically, the force and velocity of market movements, based upon prices and/or volumes of stocks. One of their applications is to detect situations of overbought and oversold assets. There are a vast number of indicators and oscillators, but one of the most commonly used is the Relative Strength Index (RSI) as this can determine if an asset is overbought or oversold by comparing the magnitude of recent gains to recent losses (Murphy, 1999).

$$\mathrm{RSI} = 100 - \frac{100}{1 + \mathrm{RS}}$$

where RS is the average of x days price increases/average of x days price decreases.

The RSI ranges from 0 to 100. An asset is overbought if the RSI approaches 70, meaning that it may be getting overvalued and is a good candidate for a pullback, or in other words, it could be a good moment to sell. Likewise, if the RSI approaches 30, the asset is oversold.

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Overpricing

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Overpricing is measured as the difference between the offer or opening price for the IPO's stock and its closing price after the first day of trading scaled by the offer price. When the opening price exceeds the closing price, the IPO is said to be overpriced. The closing price is assumed to be the equilibrium or "true" value of the stock. In this case, the IPO firm will receive excess capital

per share relative to the equilibrium value of the IPO's stock (this is the opposite of underpricing where the difference is negative, i.e., the offer price is lower than the equilibrium price). Since underpricing is often referred to as "money left on the table," we may characterize overpricing as "money-put-in-the-coffers." Let us now examine how overpricing may play out for the major players in the IPO launch. We are assuming that bookbuilding is used and that the IPO firm is WeB-Genes, a pharmaceutical-boutique holding a patent on a hot genome-product called Kur-Y'all. Because of all the extremely positive scientific and clinical evidence, the FDA has fast-tracked Kur-Y'all. For this reason, WeB-Genes has been actively courted by many of the major investment bankers (IBs). There are some possible reasons for overpricing where, by definition, the bookbuilding subscribers contribute an excess of funds to the IPO relative to the equilibrium price. Usually it is because there is a paucity of real information and an excess of reality-blurring exuberance and the investors in WeB-Genes get caught up in the hype and pay for it by accepting a stock price that is too high. This is essentially what happened in the mid-1990s relative to the dot.coms or what has been called the got.conned era. Apropos to overpricing, according to the *Financial Times*: London (April 22, 2006, p. 17) "… one banker says: 'Generally speaking, if a stock underperforms, it was because it was overpriced at the issue. It is a question of supply and demand. Sometimes you can't get a quality level of institutional investors to support the stock in the after-market'." Let us also consider the effect of overpricing from the IB perspective. The IB earns more on an overpriced offer than on an underpriced offer since they receive a percentage of the gross proceeds raised by the IPO firm. So it may seem that the IB will have an economic interest in overpricing. But this is actually not the case. Recall that in the bookbuilding process, the IB firm shops the IPO firm to potential investors. What keeps these potential investors interested in buying the IPOs is the fact that the IB usually offers them a bargain in that underpricing is the typical outcome. The IB firm would never intentionally overprice an IPO to collect a higher fee at the expense of its valued client base. This would be considered either financial high treason or evidence that the IB does not know what they are doing. In either case, the result of repeated overpricing by the IB is the same: a book with a lot of empty pages. (For related information see Underpricing, p. 487, and Bookbuilding, p. 47 and Lusk et al., 2006.)

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Oversold

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This refers to the situation in which the supply of an asset has increased to such an extent that it has forced down the asset price to a level that no longer supports its fundamentals. In such a case, the asset is considered to be undervalued. Consequently, a market correction will almost certainly occur, with

the logical result of an increase in its stock price. (See Overbought.)

Oversubscribed

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Oversubscription is a common phenomenon in initial public offerings (IPOs) and generally in the finance world. It is described as the surplus number of shares or bonds that investors would like to purchase but are not accessible due to high demand. It is mainly created in cases that a promising firm enters the market or when a company has a much lower offer price than the one expected by the investors.

Since an investor's decision is influenced by that of others, there is herding into subscribing or abstaining. As a result there can be cases of overwhelming oversubscription. As an example there has been an IPO in a major European stock exchange, which in year 2000 experienced an oversubscription of 753.41 times. The total number of shares the firm desired to issue was 6 million and the total demand from the public was 4.52 billion. The underwriters' work became very difficult in allocating the shares; they failed in doing their job well as they left a lot of money in the table due to underpricing.

Rock's "winner curse" model (1986) reports that both informed and uninformed investors apply for "good issues," while only uninformed investors apply for "bad issues." This is the reason why "good issues" are more likely to be oversubscribed. Chowdhry and Sherman (1996) suggest that given the high levels of oversubscription, the cost to the issuing firm of underpricing may be mitigated by the interest earned on the subscription pool. Therefore, the offer price is lowered and a large oversubscription for firms' shares would be expected. Alternatively, there will be instances when investors would realize that the offer price is too high and the issue would fail.

Amihud et al. (2003) present a different argument on oversubscription. They report that excess demand is affected by factors that are known before the IPO, such as issue characteristics and market conditions. In this case, underpricing has, as its primary purpose, to attract some level of oversubscription, and that issue must be priced with high underpricing.

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Over-the-Counter (OTC) Market

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Over the counter (OTC) markets denote markets where transactions take place directly between counterparties. It is opposed to organized exchanges where transactions are intermediated by an official organization (the stock exchange in

equity markets, the clearinghouse in future markets).

An important difference is that while organized exchange trading are often order-driven markets as the direct confrontation between supply and demand for assets lead to the determination of their price, OTC markets are quote-driven markets (O'Hara, 1995). Dealers first determine and announce through electronic systems, like Bloomberg or Reuters, the prices at which they are ready to buy (bid price) and to sell (ask price) the security, and then the client, who can be another dealer, decides whether to make the deal. For the dealer to earn money, the ask price is always above the bid price. Generally, quoted prices are indicative only, and better conditions, that is, inside the bid-ask spread, can be obtained during the deal.

This used to be the way trading was taking place in spot and forwards foreign exchange or bond markets. Stocks are usually traded on exchange markets. However, OTC markets exist for stocks with limited liquidity or for the exchange of large quantities (block trades) for which they are reputed to be more efficient in terms of transaction costs. By definition, futures trade on their original markets. For other derivatives, things are far more heterogeneous as shown in Table 1.

TABLE 1

An Overview of Derivative Markets during Spring 2004 (Notional Amounts in Billions USD)

	OTC Markets	Organized Exchanges
FX	31,500	98
Bond and money market	177,457	49,385
Equity	5,094	3,318
Credit	4,664	0

Source: Bank of International Settlements.

OTC derivatives are generally documented through a master agreement, which sets out the standard terms that apply to all the transactions entered into by both parties. This prevents from renegotiating the terms at each new transaction.

Historically, a standard way to distinguish between organized and OTC markets was to consider that the former are centralized with a precise geographical location while the latter are fragmented. With the advent of electronic platforms covering FX or bond markets, this line of separation has become meaningless. What remains, though, is that transactions remain private in nature (for instance, identities involved in the transaction are not disclosed to other participants).

As transactions are bilateral, counterparty risk used to be very significant in OTC markets, at the difference for instance of future markets where the clearinghouse ensures that financial obligations will be met. This does not mean that OTC markets are totally deregulated. For instance, in OTC derivative markets, International Swap Dealers Association (ISDA) edicts typical agreements that are used to help standardize and improve the transparency of transactions. In practice, this leads to mitigate the differences between organized and OTC markets.

Trading in OTC markets implies complicated strategic effects and search costs. While informed investors are assumed to face larger spreads as dealers try to protect themselves (Glosten and Milgrom, 1985), large investors can at the same time benefit from better prices as they offer access to outside options based on their ability to trade with other investors or market makers (Duffie et al., 2005).

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Ownership Buyout (OBO)

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An ownership buyout (also termed owner's buyout or owner buyout or as acronym OBO) is a special form of a buyout transaction, in which the vendor keeps control of a certain stake in the company after the transaction. This is achieved in a two-step transaction: First, the private equity company performs a regular leveraged buyout and thus acquires the target company by a special buyout vehicle (NewCo). Second, the vendor reinvests a part of the purchase price in the new vehicle and is in turn granted a stake in this vehicle. The vendor's equity stake in the new vehicle is the main feature that distinguishes ownership buyouts from other forms of buyouts. The term ownership buyout is used as an umbrella term also embracing buyins, which would be termed ownership buyin analogously.

Ownership buyouts are appropriate for buyouts in former family businesses (or owner-managed businesses). The main advantage for the selling family members is that they retain a certain stake in the company, thus facilitating the emotional valediction from the family business. In addition, an ownership buyout provides a good opportunity for families to withdraw a certain part of their family wealth by partly selling their business. By investing the return in other assets, they can apply a diversification strategy, thereby reducing idiosyncratic risk. Further, the retained ownership stake allows the family to participate in a positive future development of the business following the buyout. The ownership buyout is also advantageous for the private equity company, as the retained ownership stake ensures a cooperation with the family in the aftermath of the buyout. This ongoing involvement of the family can be of high importance with regard to the transformation process following the buyout and given the knowhow and business contacts of the former owners and managers.

P

Pairs Trading

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Pairs trading is a style of equity trading in which the trader takes market neutral positions in pairs of related equities, taking a long position in the undervalued stock and a short position in the overvalued stock. Stock selection is usually based on a market-wide screen which ranks order related stocks by standardized valuation metrics.

The relationship between equities traded in pairs is most often that they are in the same sector. However, they could also be related through cross-shareholdings or they could be different share classes in the same operating company (e.g., a stock and its ADR).

Even though an equity pair has an apparent relationship by being in the same sector or similar business lines, it need not follow that they will trade similarly in the market. To be tradable, equity pairs also need to be *mean reverting*, that is, they must trade back to an equilibrium relative value fairly reliably. There are many statistical tests for mean reversion. The most commonly applied test by equity pairs traders are the Augmented Dickey-Fuller variants. Other, more sophisticated tests exist and are increasingly commonly used.

Market neutrality is most often implemented as a cash neutral trade. In a cash neutral trade, the position consists of equal dollar amounts of long and short stock. However, this could still leave the trader long or short beta, which is sometimes also adjusted for. The position could be adjusted further to account for other risk imbalances in the position, but these are rare in practice.

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Par

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The par is the face value of a security. For example, a bond selling at par is worth the same dollar amount it was issued for or at which it will be redeemed at maturity. For a par bond, the coupon is equal to the yield at maturity and, as we will see, this equation gives rise to interesting relations. The bonds are often quoted on a basis of 100 that is the par. To obtain the face value of a bond, we must thus resort to a multiple. According to Livingston (1993), bonds are generally issued at par for tax reasons, since bonds originally issued at nonpar prices may have some unfavorable tax consequences for the purchaser. The par-yield curve is an essential tool for the market maker because the duration of a par bond is very easy to compute. Indeed, the duration (D) of a par bond is equal to (Livingston, 1993): $D = (1 + y)\,[(1 - (1 + y)^{-n})/y] = (1 + y)A_n$, where y is the bond yield to maturity. The duration of a par bond is thus $(1 + y)$ times the present value of an annuity for n periods (A_n). We can express the bond price P in terms of spot interest rates or in terms of yield to maturity:

$$P = cD_1 + cD_2 + \cdots + (c + \text{PAR})D_n$$

$$= \frac{c}{1+R_1} + \frac{c}{(1+R_2)^2} + \cdots + \frac{c+\text{PAR}}{(1+R_n)^n}$$

$$= \frac{c}{1+y} + \frac{c}{(1+y)^2} + \cdots + \frac{c}{(1+y)^n}$$

where c is the coupon, D_i the discount factors, and R_i the spot rates. This equation indicates that the yield to maturity is some polynomial function of all spot interest rates. There is generally no analytical solution for y in terms of the spot rate. It must thus be found by a numerical algorithm. But Livingston (1993) shows how the yield to maturity of a par bond can be explicitly expressed in terms of the term structure for par bonds.

We have: $\text{PAR} = cA_n + (\text{PAR})D_n$, with A_n, the annuity of n periods. We can thus write:

$$\frac{c}{\text{PAR}} = y_{\text{par}} = \frac{1 - D_n}{A_n}$$

$$= \frac{1 - D_n}{D_1 + D_2 + \cdots + D_n}$$

$$= \frac{1 - \dfrac{1}{(1+R_n)^n}}{\dfrac{1}{1+R_1} + \dfrac{1}{(1+R_2)^2} + \cdots + \dfrac{1}{(1+R_n)^n}}$$

with y_{par} the yield to maturity of a par bond. Tuckman (2002) has simplified the Livingston's approach to the construction of a par-yield curve. For a bond selling at its face value, we know that the yield to maturity is equal to the coupon rate. Therefore, to generate the par-yield curve, c, the coupon, thus satisfies the equation: $(100c/2)\,\Sigma_{t=1}^{2T} d(t/2) + 100d(T) = 100$, with d being the discount factors. Solving for c, we get: $c = 2[1 - d(T)]/\Sigma_{t=1}^{2T} d(t/2)$. This equation can be solved for each value of T to obtain the par-yield curve (Racicot and Théoret, 2004).

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Participating Underwriters

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A group of firms, often investment banks, that specialize in the underwriting process, who join together to collectively bring to the market an issue of stock, bonds or other securities. This group offering, typically called a syndicate, is generally undertaken to defray both the cost and risk of underwriting a large issuance of securities; however, this larger group also has greater marketing muscle and a larger client base they can sell to. One or more firms act as leaders for a particular syndicate. The lead underwriter manages the deal and has primary responsibility for all record keeping. The syndicate will negotiate with the issuing firm concerning the number of shares to be issued, the price per share and guarantee the issuer a total amount of capital to be raised. In turn, the syndicate attempts to resell these securities to the general public at a higher per share price, thus assuring themselves of a profit. Compensation for the participants varies and depends on the amount of the issue each firm is responsible for. If the syndicate is unable to sell these securities to the public, they will, for a fee, "stand-by" and purchase any remaining shares for their own account or for future arbitrage opportunity. Upon completion of the selling of all securities in the secondary market the syndicate is dissolved.

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Pearson Correlation Coefficient

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The Pearson correlation coefficient, r, is used to evaluate the strength of the linear relationship between two variables X and Y, via a sample of their values, (x_i, y_i) for $i = 1, \ldots, n$. It is always the case that $-1 \leq r \leq 1$, with values close to 1 indicating a strong positive linear relationship, and values close to -1 indicating a strong negative linear relationship. It is often assumed that values of r close to zero imply an absence of any relationship between the x_i and the y_i,

but it only implies that the relationship is not *linear*. For example, the set of points (x_i, y_i) with $y_i = x_i^2$ over a symmetric interval $(-a, a)$ will always generate $r = 0$. A relationship between x_i and y_i obviously exists and is deterministic, but this relationship is not linear and so r is unable to detect it.

The Spearman correlation coefficient, ρ, is better suited at detecting nonlinear relationships between variables. It is obtained by discarding the numerical values of (x_i, y_i) and preserving only their ranks and adjusting these ranks for ties. The Spearman correlation is defined as the Pearson correlation of the adjusted ranks. The Spearman correlation is very useful for measuring the relationship between ordinal variables, since values of ordinal variables are rankings by definition. To obtain ρ, analysts sometimes convert their data to ranks without adjusting for ties, and calculate r on the resulting unadjusted rankings. This will tend to bias the value of ρ upward, especially when there are many ties.

Some software packages do not provide two-tailed p-values to assess the statistical significance of r or ρ. Obtaining these p-values, however, is straightforward though Fisher's z-transform of r, or by noting that a simple transformation of ρ follows a t-distribution with $n - 2$ degrees of freedom (Greene, 2002).

One attractive feature of hedge funds, especially nondirectional hedge funds, is that they often exhibit low or negative correlation with equities and bond indices.

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Peer Group Based Style Factors

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Investors often compare the performance of a hedge fund manager with a group of managers who pursue similar investment strategies, called peer group. Averaging the individual returns of the peer group members each month (or at any other frequency) produces a return series or style factor for a particular investment style. Peer group based style factors provide information not only on industry returns but also on risk characteristics and correlation structures with other investment styles. The average returns for the style factors are most often computed using equal weights for each peer group member. Credit Suisse First Boston (CSFB)/Tremont is one of the few data providers that introduced in 2000 nine value-weighted indices (equity market neutral, long/short equity, dedicated short, managed futures, emerging markets, event driven, global macro, convertible arbitrage, and fixed income arbitrage). Fung and Hsieh (2004) note that while value-weighted benchmarks are preferable as they take into consideration the disproportional allocation to large funds, computing the appropriate weights using assets under management may be problematic for highly levered investment strategies because their invested risk capital is substantially higher. Some index providers require a minimum for assets under management or disclosure standards, such as audited financial statements, for a fund to be included

in the index. Amenc and Martellini (2003) present an overview of different industry standards for peer group based benchmarks.

Given that hedge funds employ dynamic trading strategies, hold leveraged portfolios, and invest in derivative products makes it very challenging to determine a fair benchmark to assess the skills of a manager. Traditional performance benchmarks for mutual funds, such as the S&P 500 or the Russell style indices, are no longer adequate. Therefore, investors turned to peer group averages. The advantage of using peer group based style factors is the comparison with strategies that have been implemented in practice and, thus, account for trading and transaction costs. On the downside, peer group based style factors typically rely on self-declared investment objectives and self-reported returns. There exist neither accepted norms for classifying hedge funds nor standards for reporting realized returns. To remedy the issues with self-declared investment objectives, peer groups can be extracted using cluster analysis or (constrained) regressions on the return series of primitive trading strategies representing specific styles. Another limitation to be considered is that, depending on the provider, indices are constructed from different databases. It is well documented in the literature that the most commonly used hedge fund data sources use a different nomenclature, are incomplete (selection bias, instant history bias) and exhibit major sampling differences. In addition to the problem that omitting dead funds may lead to overestimated industry returns, survivorship bias is of concern as hedge funds on the decline become small and are eventually eliminated from the peer group. Agarwal et al. (2006) merge the CISDM, HFR, MSCI, and Tass databases and use the 3924 hedge funds in operation at the end of 2002 to document the disparity between different data sources. For example, 27% of the funds are exclusively included in CISDM (23% in Tass, 20% in HFR) and a mere 3% of the hedge funds are included in all four databases. The low correlation between the HFR Composite Index and the CSFB/Tremont Composite Index over the period 1994–2002 of 0.76 as reported by Fung and Hsieh (2004) illustrates the heterogeneity further. In fact, Fung and Hsieh (2002) calculate a mean difference for annualized monthly returns of 1.5% between the HFR Performance Index and the CSFD/Tremont Hedge Fund Index over the period 1994–1999 with even larger discrepancies on an annual basis. The difference (HFR – CSFD/Tremont) is 9.5% in 1994 and −9.1% in 1997. They attribute a substantial fraction of these discrepancies to the weighting schemes used in computing monthly averages, that is, equally weighted versus value-weighted. Amenc and Martellini (2003) report that monthly returns of major hedge fund indices that are expected to represent the same investment style diverge substantially. The monthly, nonannualized returns for a specific month differ by more than 20% for the relatively well-defined category long/short (Zurich Capital Markets and Evaluation Associates Capital Markets (EACM) indices). They also report that the average pair-wise correlations among the ten index providers they study tend to be weak for nondirectional strategies; for example 0.43 for market neutral indices, 0.46 for long/short, or 0.54 for fixed-income arbitrage. The lowest correlation is as low as

−0.19 for the style long/short. On the other hand, well-defined strategies like merger arbitrage exhibit the highest homogeneity. The average correlation between all indices is 0.92 and the pair-wise correlation does not drop below 0.88. Finally, peer group based style factors are typically not investable as they cannot be specified in advance, include closed funds, and equal weighting is not feasible due to minimal capital requirements or lockup periods. The paper by Fung and Hsieh (2004) contains an extensive critique of peer group based style indices. Nevertheless, due to the lack of a generally accepted alternative, peer group based style factors are a popular tool to monitor the performance of hedge funds.

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Penalty Bid

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Penalty bid provisions may be included in underwriting contracts for initial public offerings (IPOs) in order to complement price stabilization mechanisms such as stabilizing bids and short covering in the aftermarket. They are intended to discourage flipping, that is, immediate reselling, of the allocated shares when the share price declines due to weak demand in the secondary market. The rationale behind penalty bids is to create an incentive for the members of the distribution team, that is, syndicate members, to allocate the shares to investors who will hold onto the shares or who can easily be discouraged from flipping. Penalty bids typically result either in forfeiture of the selling concession, that is, the distributing firm's compensation for the distributed shares, or in exclusion of distributing firms or of investors from future allocations. The force of the threat of exclusion, however, is very limited for large institutional investors who are indispensable for successful future placements.

The assessment of the penalty bid is not fixed in advance. In contrast, the lead underwriter may assess the penalty bid ex post. Typically, the penalty bid will not be assessed when market liquidity is low in order to avoid further deterioration of market liquidity or when considerable trading revenues at practically no risk of a price decrease can be generated from high turnover together with an increasing price in the secondary market. The effectiveness of penalty bids crucially depends on a tracking system for the allocated shares.

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Performance Fee

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Hedge fund managers typically receive a performance fee as a proportion of about 15–25% of the generated return in addition to a fixed percentage management fee that usually amounts to 1–2% of the fund's assets. The performance fee is paid on a quarterly or annual basis, and it typically must be paid if and only if the manager reaches certain investment goals such as a high-water mark or a hurdle rate. Most hedge fund managers receive performance fee payments conditional upon the investor's share value exceeding a high-water mark, which represents the previously reached maximum share value since the investor's investment. In practice, the high-water mark level is reset on a quarterly or an annual basis. Many funds apply a hurdle rate, that is, benchmark performance, such as the T-bill rate that the fund's return must exceed before the performance fee becomes effective.

The rationale behind this fee lies in the very nature of hedge funds. While mutual fund managers participate from an above-average performance through new investors and increased portfolio assets due to the fixed percentage management fee, hedge funds often limit their assets under management and do not accept new money. Consequently, performance-oriented compensation must be directly performance-linked to align the manager's interest to that of the investors, because the manager receives the extra payment only if the investor benefits from positive performance. The motivating character of the performance fee is intensified by an option-like payment structure when combined with the high-water mark.

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Performance Persistence

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The persistence of a fund performance represents the extent to which the fund manager is able to generate consistently performance over time. Namely, fund performance is said to persist when the fund belongs to the winner group (e.g., a superior performance lying above some estimated median performance level) over several periods of time. Specifically, performance persistence captures two dimensions of fund management, namely the ability to generate excess return as compared to a given benchmark portfolio (e.g., manager skills such as market-timing ability and stock picking ability), and the ability to maintain performance over time (e.g., to do better than other competitive managers or to be outperforming through time).

There currently exists three approaches for measuring performance persistence, namely contingency tables (e.g., counting the number of time periods with outperforming returns), regression studies

(assessing the impact of past fund alphas on current fund alphas), and finally funds' ranking based on appropriate performance measures (e.g., appraisal ratio, modified Sharpe ratio, Park ratio, alternative investment risk-adjusted performance). In the light of the three approaches aforementioned, current academic and empirical research has identified and exhibited key features of performance persistence. First, a short-term persistence up to 1 year has been acknowledged with stronger evidence up to a 3-month horizon. Indeed, some funds exhibit a short-term positive correlation in their respective abnormal returns (i.e., risk-adjusted returns or positive alphas) over subsequent time periods. Second, the persistence of fund performance can be explained by a set of key security-based factors such as size (i.e., market capitalization), value, momentum (e.g., short-term past performance), fees and expenses (e.g., management and incentive fees, performance fees, load charges, operating fees, transactions costs), and investment style (e.g., aggressive and/or conservative investments focusing on aggressive growth, growth, growth and income, balanced or income securities among others) as well as related style consistency. Indeed, it is highly important to balance gross investment returns or gross excess returns with corresponding underlying investment expenses. For example, capitalization is negatively linked with hedge fund returns. Moreover, size and management fees are negatively linked with performance persistence. Specifically, a persistent positive performance characterizes essentially funds with low management fees. Finally, funds with consistent investment style over time yield better absolute and relative performance. In general, style consistent funds also tend to manage portfolios with a low turnover (e.g., low transaction costs). So far, poor performers are shown to persist over time whereas good performers can persist over time only due to a chance factor. Furthermore, performance persistence is conditional on the length of the time period under consideration.

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Piggyback Registration

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Piggyback registration is allowing investors (venture capitalists) who bought company stock earlier to include their shares in a public offering the company is already conducting. The venture capital investors generally get piggyback registration rights that enable them to sell their shares on IPOs or other public offerings the company conducts.

Venture capitalists invest in companies in early stage because they believe the securities acquired in the invested company could be turned into more "liquid" assets in a reasonable time frame. However, securities

acquired in private equity financing stage are restricted. Therefore, investors will negotiate with companies on exit strategies called registration rights. These rights provide opportunities to the investors to sell their securities to the public. There are two types of registration rights: demand registration rights and piggyback registration rights. Demand registration rights enable the investor to require the invested company to register the company's shares owned by the investor for sale to the public even if the company was not considering issuing any securities to the public at that time. Piggyback registration rights give to the investors the right to include their shares in a registration conducted by the invested company or by another shareholder.

The management of the invested company and investors might not always agree on the timing and nature of offering shares to the public. Sometimes they might have different perspectives and sometimes different interests. Moreover registration can be very expensive and time-consuming for the managers. Thus, demand registration rights are more burdensome for companies and indeed are rarely exercised. However, the holders of these rights can greatly influence the company management with respect to the nature and timing of the registration. On the other hand, since marginal cost of including shares of investor who holds piggyback registration rights is relatively small on an ongoing registration process, piggyback registration rights are exercised much more frequently than demand registration rights (Gutterman, 1994).

However, most piggyback registration rights agreements include situations in which the company can exclude the piggyback registration right holder's shares from an ongoing offering. If the underwriters of the offering determine that there is not enough demand in the market for the company shares and including piggyback shares on the offering will lower the share price, the company can exclude them from the registration. In such cases, shares to be sold under piggyback registration rights are usually excluded from an offering in favor of shares sold by the company and shares of demand registration rights holders (Ostrognai, 2001).

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Pipeline

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Pipeline is a term for securities that have entered into, but not yet completed, the underwriting process before public distribution. As such, it is a measure of the flow in upcoming underwriting deals for investment banks, and market observers often look to the current pipeline as an indicator of financing activity. The securities being underwritten are commonly referred to as being "in the pipeline" (Scott, 2003). Underwriters will attempt to keep several securities in the pipeline in order to sell them to investors when market conditions

are favorable (Downes and Goodman, 2003). Since the underwriting process for all publicly sold securities includes a mandatory review by and registration with the Securities and Exchange Commission (SEC), the flow of upcoming deals is alternatively referred to as the "SEC pipeline" by some in the investment industry.

To avoid possible confusion, it should also be noted that the term "pipeline" has other distinct and quite different meanings that are well-established in the investment industry, most notably in conjunction with the mortgage industry and the concept of "pipeline risk."

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Pit

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A *pit* is a designated area, at an open-outcry exchange-trading floor, where transactions concerning a specific contract type are done. The majority of pits are either polygonal or circular platforms with one or more concentric rings of steps dropping towards the center, hence "pit." For futures contracts, each underlying (for example, a particular commodity) is traded in a different pit and, in each pit, traders of a given delivery date are grouped on a specific area. For the nearby contract, that is often the topmost steps of the pit. This is convenient, not only because this tends to be most actively traded contract (and top steps are larger) but also because top steps are closer to phone desks of the futures commission merchants. Less frequently, pits are divided into slices, like a pie, in which case the trading of different delivery dates is located in different slices of the pit. For purpose of ticker or wallboard display, bidding information is collected by exchange employees in a pulpit, usually located on the fringe of the pit.

At one pit, one can find people with various roles: general employees of the exchange, out trade clerks, market reporters, runners, arbitrage clerks, phone clerks, deck holders and exchange member traders. Out trade clerks are employees of the brokerage firms and exchange members in charge of solving inconsistencies in trades from the previous day each morning before the beginning of the standard trading hours. Market reportrs are employed by the exchange and their job at the pit is to report and process price information. Runners, arbitrage clerks, phone clerks, and deck holders are employees of various member firms or individual brokers. Runners carry orders and other information to the brokers. Arbitrage clerks use hand signs to communicate trading information from the pits to the phones. Phone clerks are on the phone at workstations around the pit and deck holders hold orders for the traders.

Depending on the exchange and their role in the pit, different traders and staff use jackets of different colors, to help identifying themselves. For instance, at the Chicago Mercantile Exchange (CME), there can be jackets of at least five different colors in each

pit. Dark blue jackets are used by general employees at the exchange, out trade clerks wear green jackets with panels on the back, individuals with light blue jackets are market reporters and the yellow jackets are runners, arbitrage clerks, phone clerks, or deck holders. Members supplied by the exchange use the traditional trading red jacket; however, some traders also have jackets specially designed and with unusual patterns, to increase their visibility within the trading pit.

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Pooled Fund

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A pooled fund is an aggregation of funds that investors contribute for the purposes of investment by a professional money manager. The money manager invests the funds mainly in a portfolio of stocks, bonds or money market instruments depending on the investment objective that has been arranged for the fund. A pooled fund can be offered through banks, investment management firms, trust companies, insurance companies, or other organizations. Fees that have to be paid for administration and management are divided into the sales charge and the annual operating expenses. The sales charge depends on the way the fund is distributed and is a "one-time" charge for specific transactions such as purchasing, while the annual operating expenses that include the management fee, distribution fee and other expenses are debited annually from the investors' fund balance. In return for depositing funds, the investors receive units or shares of the fund, which represent a pro-rate share of the fund's investments. The fund investor achieves a higher degree of diversification than an individual could achieve, but at a lower cost. An individually managed portfolio can also achieve diversification, but the extent of diversification will be limited by available funds. For relatively small amounts of available investment funds, adequate portfolio diversification comes with significant transaction costs. Pooled funds can either be open-ended or closed-ended. Stable-valued pooled funds behave similarly to mutual funds, but they differ in their legal form under securities law. Stable-valued pooled funds are exempt from registration as securities with the Securities and Exchange Commission (Fabozzi, 2002).

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Position Limit

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The position limit is the maximum number of contracts that can be held by an investor or group of investors before they are considered to be "large traders." In the case of

commodities, large traders are subject to oversight by the Commodities Futures Trading Commission. The position limit for commodities depends on the type of commodity. For options, it is the maximum amount of contracts that an individual or group of investors can have on an underlying security. "The current limit is 2,000 contracts on the same side of the market (for example, long calls and short puts are on the same side of the market), the limit applies to all expiration dates" (Downs and Goodman, 2003). Position limits are designed to limit the amount of risk exposure for a particular investor or group of investors. Additionally, any person who is the owner or beneficial owner of 10% or more of an equity class must file a report with the SEC. This report is called a Section 12 registration, and it requires the person to report all their holdings of the issuing security. Subsequently, the person is also required under Section 16(a) to report changes in their ownership in the reported security.

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Position Trader

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A position trader can be defined as one who either buys or sells contracts and holds them at least overnight. Position traders usually hold positions for a few days, weeks, or even for months (Kolb, 1994; Chance, 1997). Trading expenses and analysis techniques differ according to trade duration. Position traders are more concerned about long-term trends and believe that they can make a profit by waiting for major market movements. Fixed costs are slightly low for position traders and they are likely to use long-term technical analysis for evaluating trade opportunities. Position trading is safer than other types of trading, mainly because position traders are not pressed for time and can stay in the trade to earn more or to minimize losses. Futures trading involves risk and may not be suitable for all types of investors. Several factors such as market conditions and seasonality effects affect the timing of trading. Seasonality is an important factor for position traders to take into consideration. Since position traders stay in the trade longer, they can better cope with any seasonal variations. Generally, day trading and position trading have a great deal in common. Technical analysis and fundamentals help improve both kinds of trading.

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Post-Money Valuation

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In private equity, Post-Money Valuation refers to the valuation of the investment

in a company immediately after it receives new funding. The post-money share value is thus equal to the total value of the company divided by the total number of shares after the investment.

For start-up companies, Sahlman and Sherlis (1987) propose to get the post-money value by estimating the future value of the company at the date of exit by the investor (terminal value) and discounting it at the corporate cost of capital. Inderst and Müller (2004) find that both the pre-money and the post-money valuations of start-ups are increasing functions of the degree of market competition.

The post-money evaluation must account for all possible types of dilution resulting from the conversion of convertible securities (debt; preferred stock) and the exercise of warrants or employee stock ownership plans (ESOP). Consider for instance a firm with 500,000 shares outstanding, valued at \$11, before new funds infusion. The company has issued warrants for 100,000 shares at \$5 per share. The venture capitalist is willing invest \$4,000,000. If the unit share price is agreed to be \$10 for this new investment, the investor receives \$400,000 shares or 40% of the capital, corresponding to a post-money evaluation of \$10,000,000 for the whole company.

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Postponement

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Postponement is an activity of pushing back the tentative calendar date of an offering of stock under certain conditions. Usually, the timing and listing of an offering depends on the approval of the stock exchange, which includes the firm's achievement of the conditions determined and imposed by the board of trade. If the conditions are not fulfilled and market conditions threaten the viability of the offering, the offering might be postponed. Apart from postponement, it is also possible that the deal is removed entirely in the case of market conditions leading to a point at which the deal is not viable.

Especially in the case of initial public offering (IPO), postponement occurs occasionally. An example of IPO postponement is the one of immuno-designed molecules (IDM). They announced the postponement 1 day before the IPO was planned. "Current market conditions" were stated as the reason. In the course of this postponement, investors feared effects on other IPOs, because IDM was one of the strongest firms in Europe, which planned to go public (Scrip, 2004). An overview of theoretical models describing and explaining the situation of IPO postponement and the consequences with rational and semi-rational theories is provided by Ritter and Welch (2002), for instance.

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Prearranged Trading

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Prearranged trading illustrates an implied agreement between brokers. Mostly this agreement is private and only known to the participating brokers. While trading, a lot of floor traders and floor brokers are offering and/or bidding. Now it is possible that, for example, a commodity dealer does not want to trade commodities at market prices because of market risk. He can avoid this risk under a prearranged trade with another commodity dealer on predetermined prices. Prearranged trading is often used to gain tax advantages. That is the reason why this kind of arrangement is prohibited by the Commodity Future Trading Commission (CFTC). The prohibition of such a behavior is regulated in the rule 539 of the Chicago Mercantile Exchange (CME). Another negative result is the limiting of stock exchange trading. Because prearranged trading happens besides the regular trading, the traded commodity under this arrangement is not traded at the stock exchange. This causes a limitation of the regularly traded commodities and hence pushes the prices upwards because the supply is much less than that without prearranged trading. There are some exceptions that allow prearranged trading. This is regulated under Rule 10b5-1 of the United States Securities and Exchange Commission (SEC). Individuals who are not in possession of nonpublic information can sell and buy stocks or commodities of a company under prearranged trading plans.

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Preliminary Prospectus

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The *preliminary prospectus* is a document initially prepared by the underwriter of a new issue of a publicly traded security. This legal disclosure provides buyers information relating to the objectives, terms, and risks of the public placement. The preliminary prospectus can also help generate interest in the security and can increase potential valuation by reducing uncertainty with regard to the business plan associated with the underlying enterprise. This disclosure also protects the issuer from legal liabilities that may otherwise flow from nondisclosure of facts pertinent to the valuation of the security.

The preliminary prospectus does not substitute for the due diligence a buyer would exercise in their decision to purchase the security. While the price of traded securities is said to incorporate all market information (under the efficient market hypothesis), there is an important role of pre-issuance

information for potential investors. Since new issues typically attract experienced and diversified investors, the preliminary prospectus is considered but one piece of information as part of a more complete analysis of the potential market valuation of the new issue.

This preliminary prospectus informs potential investors awaiting the publication of the final prospectus, which is produced in advance of the issuance of the publicly traded security.

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Premium

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The option premium is the amount of money paid by the buyer of an option to its seller (or option writer). It is the price paid for the right to buy or to sell an underlying asset provided by the option. Although each option on a stock usually gives the right to buy or sell 100 shares, the option premium is set on a per share basis. A premium of \$1.50 on a Bombardier stock option implies that the option contract will cost \$150 (i.e., \$1.50 $\times$ 100). The option premium is the sum of two components: the intrinsic value (which is the positive difference between the security price and the strike price for a call option or between the strike price and the security price for a put option) and the time value (which is the value attributed to the time remaining until the expiration of the option). The option premium is the maximum profit that the writer can expect from its transaction with the buyer. This maximum profit occurs when the option he has written expires unexercised. For a speculator, the premium can be seen as an investment from which he expects to make a profit through the exercise of the option. He incurs a loss equivalent to the amount of this premium if the option ends unexercised. However, for someone seeking a protection against a given risk, it is analogous to an insurance premium paid to an insurance company.

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Pre-Money Valuation

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Pre-money valuation represents the value of a company immediately before the new investment. It thus accounts for the share of company value that can be attributed to

the existing shareholders and management team. Pre-money valuation can be inferred from the post-money valuation from the following relationship:

$$\text{Pre-money valuation} = \text{post-money valuation} - \text{additional investment}$$

Pre-money valuation is an important company value because it serves as a basis for the negotiation of the share of equity given in exchange of the new funds invested. For instance, imagine a start-up company whose entrepreneurs initially invested $100,000, represented by 1000 shares of common equity with a par value of $100. The venture capitalist agrees to invest $750,000 in exchange of 60% of the capital of the company, which is valued at $1,250,000. This corresponds to a number of shares equal to 1500 and a unit share price of $500. The pre-money value of the company is $1,250,000 − $750,000 = $500,000. The difference with the initial investment of the entrepreneur is $500,000 − $100,000 = $400,000, which corresponds to the net present value of the company that returns to the entrepreneur. The ability to extract a high pre-money valuation from the negotiation indicates the bargaining power of the entrepreneur relative to the venture capitalist. Gompers and Lerner (2000) have shown that the higher the competition on the capital market, the higher this bargaining power and so the higher the pre-money valuations.

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Price Basing

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Price basing is a method where producers, processors, merchants, or consumers of a commodity establish commercial transaction prices based on the futures price for the same or a related commodity. For example, a producer can offer to sell corn at 5 cents over the December futures price. This practice is commonly used in grain, oilseeds, natural gas, petroleum products, and metal markets. Using futures contracts with similar underlying commodities as a pricing benchmark for commercial commodity transactions allows smaller participants in the commercial market for commodities to factor in different variables. It also permits these individuals and companies, who may or may not trade in the futures market, to reach a more informed price without the related cost of research. The cash market transaction prices established through price basing may be either spot or forward prices. The extent to which the futures price information is used in price basing provides a relevant factor for determining the contribution of the futures market to price discovery. In certain circumstances, prices discovered on a futures market may be such an integral and indispensable part of the price determination process in the underlying cash market that bids, offers, or cash market transaction prices have a relatively high correlation to the prices discovered on the futures market. For instance, many long-established organized futures markets for agricultural, metal, and energy commodities appear to perform a crucial price

discovery role for the broader cash markets, as reflected by the widespread practice of price basing in many of these markets. To that end, price basing motivates timely dissemination of the price information by the futures market.

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Price Discovery

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Price discovery is the mechanism by which asset market prices are formed. It is a process of information aggregation, where market participants' opinions about an asset's value are summarized in that asset's market price. Assets may have interrelated values but be traded in different markets. In these cases, price discovery of the common value component may occur in one market, with the value information subsequently transmitted to the other market(s).

In commodity markets, price discovery is generally used to determine spot prices, which are dependent upon market conditions affecting supply and demand. Price discovery in commodity futures markets is commonly referred to as the use of futures prices to determine expectations about the pricing of future cash market transactions (Schroeder and Goodwin, 1991; Working, 1948).

There has been intense debate in the literature over whether the spot or the futures market is the source of the price discovery in commodity markets. Stein (1981) showed that spot and futures prices for a certain commodity are determined simultaneously. But Garbade and Silber (1983) argue that price discovery takes place in the most liquid market. Furthermore, other studies have emphasized the role of storage in price discovery, because arbitrage may work through storage. In the absence of storage, there is no effective arbitrage, and thus it appears there is no other economic force linking spot and futures prices together.

Following this argument, it seems unlikely that futures prices are unbiased predictors of future cash prices (Yang et al., 2001). Using cointegration analysis (see, e.g., Quan, 1992; Schwartz and Szakmary, 1994), we can test empirically whether futures prices are unbiased estimates of spot prices (the unbiasedness hypothesis). For a perfectly storable commodity, with the absence of arbitrage through storage, the following interrelationship holds in the long term (Yang et al., 2001):

$$F_{T|t} = (S_t + U)\mathrm{e}^{r(T-t)}$$

where $F_{T|t}$ is the price of the futures contract at time t, with settlement date at time T. S_t is the spot price at time t, r the interest rate, and U the present value of all storage costs during the maturity of the futures contract. For a perfectly storable commodity, the storage costs U can be negligible. Thus, we can write the following equation:

$$\ln F_{T|t} = \ln S_t + r(T-t)$$

If the interest rate is characterized as a nonstationary part of the cost of carry, cash and futures prices may drift apart in the long

term because of the stochastic trend of the interest rate. Thus, the time series property of the interest rate influences the cointegration test. However, if the three variables futures price, spot price, and interest cost $r(T - t)$ are cointegrated, then the cash-equivalent futures price, according to Zapata and Fortenbery (1996), is

$$\ln(\text{cash} - \text{equivalent futures prices}) = \ln(\text{future price}) - r(T - t)/360$$

For nonstorable commodities, forward pricing assumes the only economic role of futures markets (Black, 1976). According to forward pricing, anticipated supply and demand is reflected in the futures prices, and the following relationship exists between spot and futures prices:

$$F_{T|t} = E_t[S_T] \quad \text{or} \quad F_{T|t} = S_T + e_T$$

where E_t is the expectation operator applied at time t, and e_T is a white noise term. If S_T is $I(1)$, that is, stationary in first differences with a constant mean, the following empirical specification can be obtained, according to Brenner and Kroner (1995):

$$F_{T|t} = u + S_T + e_T$$

where u denotes the constant that should capture other components of cash and futures price differentials.

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Price Limit

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Price limits generally refer to the maximum amount by which the price of a futures contract can increase or decrease during a trading day from the contract's closing or settlement price on the prior day. Price limits are sometimes referred to as daily price limits or daily limits, since they traditionally dictate the amount by which a price can move in a day. For example, the price limit in CBOT soybeans is 50 cents per bushel

(except that there is no limit during the delivery month). If today's closing price for a nondelivery month soybean contract is $10.00, then no trading tomorrow can take place at a price higher than $10.50 or lower than $9.50. If market participants believe the value of soybeans is actually $12, then there will be only bids at 10.50 and no offers and thus no transactions. The market has essentially stopped trading. People would call this market "limit bid" or "locked limit." This also means futures traders who wish to offset existing positions would have trouble doing so. Someone wanting to buy to offset a short position would simply become one of the many limit bidders unable to find a seller at that price. Someone wanting to sell to offset a long position would be able to sell at $10.50, but would be reluctant to do so knowing that $10.50 is significantly below current value.

There is an incredible variety in the structure of price limits from exchange to exchange and contract to contract. And over time, exchanges will change their rules regarding price limits on specific contracts. Some contracts such as CME currencies have no price limits. Some price limits are very simple as in CBOT corn, which has a 20 cent per bushel limit every day except during the delivery month when there is no limit. Soybeans, as mentioned above, are structured the same, though the limit is 50 cents per bushel per day.

NYMEX energy contracts have more complex limits. Crude oil, for example, has a daily limit of $10 per barrel. However, if the contract is locked at the limit for 5 min, a 5 min trading halt is called and trading then opens with a new wider limit of $20. Should trading still be locked limit at the $20 limit for 5 min, then another 5 min trading halt is called, after which the new limit becomes another $10 wider. This continues until the limit grows wide enough to accommodate where the market wants to go.

The most comprehensive and complicated limits are those in stock index futures, which came about in the year following the big stock market crash of October 19, 1987. These limits, which are also known as circuit breakers (because it's like cutting the power when a market is in freefall) or trading halts (because when the price triggers are hit it calls for a temporary trading halt), have changed many times. There are four percentage limits: 5, 10, 15, and 20%. Once a quarter, specific price limits are set by applying these percentages to the average closing price of the lead month futures contract. So if the market is limit bid or offered at 5% for 10 min, then trading is halted for 2 min and then resumes with the 10% limit in place. Halts and resumptions of trading are coordinated with the New York Stock Exchange for the 10% limit. Floor traded stock index contracts have halts for price declines only, while electronic markets have symmetrical limits both up and down.

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Price Range

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The minimum and maximum price at which the shares in an initial public offering (IPO) are likely to be sold to investors is the price

range within which an issue is initially marketed to investors (Hanley, 1993). The price range is included in the preliminary prospectus for issues that are marketed through the bookbuilding process (Loughran and Ritter, 2002). The expected price of the offer is then the average of the minimum and maximum price shown in the preliminary prospectus. The price at which the shares are sold to investors at the IPO can be outside or within the price range. The final offer price could be set higher than the maximum of the price range if there is a strong demand for the shares during the bookbuilding process (Benveniste and Wilhelm, 1997). On the other hand issues, which attract little interest during the marketing period, could be priced below the minimum of the price range. The bulk of IPOs are, however, priced within the initial price range. The investment banker usually values the shares of the IPO firm on the basis of the price-earnings ratio or other ratios of comparable firms that are already trading on the stock market. This valuation information is then used to set the initial price range for the issue. The comparable firm valuation approach is more widely used than discounted cash flow approaches because it can be applied to companies that do not provide positive initial cash flows.

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Price Revision

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When a firm undertakes an initial public offering (IPO), it must include in its prospectus a preliminary filing range, which provides an estimate of the expected per share offer price. Although the range identifies high and low points, the midpoint of the range receives most of the attention. Prior to the offering, both industry and market conditions change, which may warrant adjustments to the filing range. These changes, called price revisions, may occur throughout the process, including just days before the actual offering. The final offer price revision occurs when the actual offer price is set, which may be above or below the preliminary (or adjusted) filing range. However, legal limits exist on the extent of price revisions, as firms must use an actual offer price that is within 20% (above or below) of the final filing range.

Price revisions are highly correlated to aftermarket performance on the first trading day (i.e., initial return), with positive offer price revisions being associated with higher first-day returns. Two potential explanations exist for this phenomenon. First, upward price revisions signal good market conditions; thus, the correlation may really be driven by the cause of the revision and not necessarily the revision itself. Second, it is possible that firms do not fully adjust offer prices in response to new information, either due to limits placed on the revision or in an attempt to reward institutional investors for revealing such information.

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Prime Broker

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Prime brokers are financial intermediaries, particularly investments banks, who offer a number of different services for professional wealth managers, market makers, arbitrageurs, specialists, pension funds, foundations, and hedge funds. The two largest prime brokers are Goldman Sachs and Morgan Stanley followed by smaller service providers such as Citigroup, JP Morgan (who acquired Bear in 2008), Merill Lynch and UBS. However with the subprime crisis the market is and will be redistributed.

The first prime broker services were established during the 1970s and the 1980s by brokerage firms who saw business opportunities in offering a range of services to hedge funds and other professional wealth managers. Until then, these firms had many administrative liabilities that did not belong to their core businesses, such as consolidating positions from different brokerage houses, performance measurements, and reporting functions. Prime brokers offer the ability to manage all transactions in one centralized master account, which manages all cash and securities positions for the fund or manager. As hedge funds and their trading strategies became more sophisticated, the need for more comprehensive services grew significantly. Nowadays, the core services cover settlement, custody, and clearing of all kinds of assets (i.e., equity, fixed income, swaps, warrants, derivatives), security lending of captive and noncaptive assets (see Figure 1), financing (leverage), portfolio accounting and reporting (i.e., daily and monthly reports, performance analysis), risk analytics, cash management, trading services, and technical and operational support (i.e., for pretrade research, multi-asset trading, order

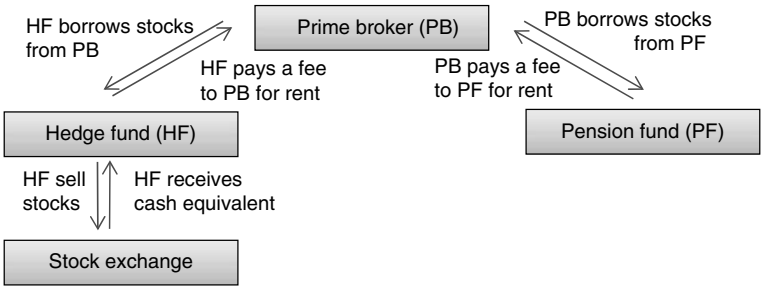

FIGURE 1
Prime broker flow chart. (From Hilpold and Kaiser, 2005.)

entry, etc.). Most prime brokers offer additional "value-added" services as well, such as capital introduction, office space lending and servicing, risk management advisory services, and consulting services.

Prime brokers generally do not charge one set fee; they take a percentage of clients' trading activities. Their major sources of income are the financing and lending spreads on long and (especially) short cash, and the security positions of the client (see Figure 1). However, prime brokers may also charge fees for clearing and other value-added services.

Prime brokerage has become an increasingly important business segment over the last few years, with revenues of U.S. $5 billion at the end of 2004 and estimations of about U.S. $11.5 billion at the end of 2009 (Celent, 2004). As revenue has grown, the business has also become more competitive, with more providers entering the market. Furthermore, while historically hedge funds had only one prime broker, in 2006, three-quarters of the largest hedge funds with more than U.S. $1 billion under management had at least two prime brokers. Nowadays, smaller funds also tend to employ more than one prime broker (Merrill Lynch, 2007).

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Principal

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1. *Principal amount* is the total amount borrowed or lent exclusive of interest or premium.
2. The party in a *principal–agent* relationship who hires an agent to act on his or her behalf. A principal–agent problem (or an *agency problem*) arises due to asymmetric information of either the hidden actions or hidden information type and the fact that the two parties have different objectives. For example, in a owner–manager relationship the principal owner may not be able to observe the effort choice of the manager; in a bank–borrower relationship the bank may not be able to distinguish the type of the borrower; in a relationship between insurance companies and insured individuals, the insurance company cannot observe the effort level of the individual to avoid the loss against which he has insured. The unobserved actions or information of the agent affect the payoffs of the two parties differently giving rise to a conflict of interests. In order to overcome this problem, the principal must design a compensation scheme or contract to provide the agent with incentives to act in the principal's interests. The optimal compensation scheme maximizes the principal's expected utility subject to the agent's *individual rationality constraint* to ensure the agent

is willing to accept the contract and the agent's *incentive compatibility constraint* to ensure the agent undertakes the action that maximizes his expected utility given the contract.

Principal Shareholder

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Principal shareholder is any shareholder who directly or indirectly owns or controls 10% or more interest of a public company's outstanding voting securities. Principal shareholders, along with officers and directors, are considered company insiders. Insiders are required by the U.S. Securities and Exchange Commission (SEC) to report all beneficial ownership of and transactions in their company's securities pursuant to Securities Exchange Act of 1934 (1934 Act) insider trading rules. Insider trading rules require insiders such as principal shareholders to file with the SEC, the company and any applicable self-regulatory organization a disclosure statement pursuant to Section 16 of the 1934 Act on Form 3, Form 4, or Form 5. Principal shareholders file Form 3 after first becoming a 10% or more holder, and file the monthly Form 4 or annual Form 5 after a change in beneficial ownership has occurred. Insider trading rules also require insiders such as principal shareholders to file with the SEC, the company, and any applicable self-regulatory organization a disclosure statement detailing the security transactions pursuant to Section 13(d) of the 1934 Act on Schedule 13D or Schedule 13G. Schedule 13D is required upon becoming a 10% or more owner unless the principal shareholder is a passive investor, is eligible, and elects the simpler Schedule 13G. Amendments to Schedule 13D or Schedule 13G are required to be filed upon a material increase or decrease in the number of voting securities owned.

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Private Equity

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Private equity refers to an investment in an ownership of an asset which is usually not traded on the public exchange. It is a broad asset class that includes buyouts and venture capital, from seed funding to mezzanine capital for companies that are preparing for listing on the stock exchanges. Well-known private equity firms such as Blackstone, Carlyle, and Kohlberg Kravis and Roberts (more commonly referred to as KKR) also frequently acquire ownership and control of companies listed on public exchanges and take them private.

Other nonconventional forms of private equity include investment in collateralized debt obligations, structured transactions in

listed companies (and delisting them from the exchanges), purchase of distressed debts through a special investment vehicle, as well as convertible debt (with option to convert into equity stakes at pre-negotiated valuations), and share swaps between unlisted companies to bring about a merger of two companies.

There are generally three reasons for investing in private equity; they are diversification, control, and return enhancement. While the performance of private equity is correlated with that of public equity markets, the imperfect correlation offers scope for investment diversification. In both venture capital and buyouts, private equity firms typically control management, and in some cases they bring in new management to chart and implement new strategies for the companies. The restructuring may involve divestments of certain business divisions, new acquisitions, or mergers with other companies. Since private equity can generate substantial returns, a small investment allocation to private equity in the institutional investment portfolio can enhance the overall performance of a portfolio.

The investment in private equity funds is usually opportunity-driven, due to the limited opportunities in investing in top funds. As such, the annual asset allocation for a fund manager in the private equity asset class may be dependent on the opportunities then available, which are dependent on the fund raising cycle of the private equity firms. Private equity investing has grown explosively, with 75% of the growth of the last 20 years, that is from 1985 to 2005, connected in the last 5 years. However, private equity is still small in comparison with the public equity and fixed income asset classes. Globally, private equity average pooled net internal rate of return has outperformed public equity net returns over the past 20 years, in line with the higher risk of private equity investing. A small number of the top private equity firms consistently achieved superior returns. There is no general agreement if superior performance is due to a particular investing style, or the size of the private equity fund and/or the size of the private equity deal.

The global private equity market has grown tremendously since 1990. At least U.S. $155 billion of private equity and venture capital was invested globally in 2003. This is an increase of 43% on the 2002 level of U.S. $109 billion, equivalent to 0.48% of the world GDP. In 2004, $110 billion of private equity and venture capital was invested, down 5% from 2003 levels which is equivalent to 0.30% of the world's GDP.

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Private Placement

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A private placement is a private sale of securities that are not registered by a firm to experienced institutions or to a group of individuals. The securities can be either debt or equity instruments, or the issuing

company itself can be either public or private. Although exempt from registration with the Securities and Exchange Commission (SEC), private placements are still regulated by the SEC, primarily under Regulation D of the Securities Act of 1933. While many revisions have been made to Regulation D since its adoption in 1982, some of the basic requirements for a private placement typically include the following (SEC, 2006):

a. Sales only to Accredited Investors (as defined in Regulation D)
b. Securities can only be purchased for investment purposes and cannot be resold to the public or in secondary markets
c. A company may not use public solicitation or advertising to market the securities

Private placements can offer advantages versus publicly issued securities, particularly to smaller businesses that are unable to efficiently access long-term debt markets. Chief among these is the lower cost versus a public offering. By avoiding the time consuming and expensive registration process and subsequent marketing effort (often called a "road show") typically associated with a public raise, private placements can offer quicker and less expensive access to capital. Other advantages include the ability of companies to target investors with particular traits (e.g., longer term investment horizons, compatible interests, strategic value to the company), retention of private status by nonpublic companies, and greater flexibility for public companies in raising capital. Finally, private placements are often the only available source of capital to start-up or developing businesses (Hillstrom and Hillstrom, 2002).

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Privately Held

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A company is privately held if its shares are not traded on the open market, the opposite of a public company. In most cases the company's founders and/or their heirs, management or a group of private investors, own the company. Apart from the owner structure, one of the biggest differences between a private and a public company is the obligations for public disclosure. Public companies are required to release reports on a regular basis, for example, to file quarterly earnings reports to the shareholders and the public. Private companies, however, do not have similar disclosure obligations to the public (Zellweger et al., 2006). Privately held companies have usually no access to the financial markets via selling stock or bonds but have to finance internally or by private funding. In contrast to common belief, privately held companies can reach an enormous size and turnover, for example, Koch Industries, Cargill, Mars, Bechtel, or large law firms (www.forbes.com). The notion privately held company is sometimes also used as opposite to state-owned companies.

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Projection

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A projection is a quantitative estimate of future economic or financial performance. In private equity, capital commitments are typically drawn down across an investment period of several years. Limited partners start to receive distributions before all the capital is drawn down. This unique cash flow pattern makes it difficult for investors to gauge their asset allocation. Investment model can be created to draw projections of future private equity market. They help the general partners to anticipate market environment and to plan their commitments accordingly. Projections can be generated by using econometric models, such as the CEPRES PerFore models (2006), to predict the future performance trends of a company, country or other financial entity. These models are typically market simulations by computer programs that take a number of variables, standard cash flows in the industry, historical and current market information as input and generate future financial performance trends.

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Prospectus

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The prospectus is a legal document that institutions and corporations, as well as businesses use to explain the types of securities they provide to buyer and participants. Henry et al. (2002, p. 7) mention that prospectus informs the investors about the issue and whatever it needs to be cleared with the Stock Exchange in order for the firm to obtain a listing and they support that "… regulatory framework states that a prospectus must include all information deemed necessary by investors and their professional brokers/advisers would practically entail and expect to find for the purpose of making an informed judgment and evaluation of the assets and liabilities, current financial position, profits and future outlook of a corporation."

The prospectus is not just a report that provides information to the investors. It is a valuable document in the hand of many knowledgeable individuals, who are able to assess the potential performance of the firm. Prospectus includes figures that will double checked statements, which will be evaluated and proposals on the uses of capital raised that will be assessed in the future. Every single firm has to face many questions during the preparation of this document.

A prospectus commonly provides investors with material information about

stocks and other investments, such as a description of the company's business, financial statements, a list of material properties, qualitative information about the company and its management (scope of diversification, the business and financial risk of the company, quality of the management), the intended use of proceeds from the issue, the forecast of next year's gross earnings per share and gross dividends per share, the key assumptions on which these forecasts are based and any other material information (Bhabra and Pettway, 2003).

Among the plethora of information, there is one that by its own, can signal the quality of the firm (Allen and Faulhaber, 1989). In markets with voluntary status, the provision of earnings forecasts is a crucial figure that will motivate many investors to apply for shares. A lack in providing this source will cost the reputation and capital that can be raised. On the other hand, it is not the simplest target for an IPO to include earning forecast, as they need to spend a significant amount of money in order to provide an accurate figure. Failure to do so will cost in the future.

In a securities offering in the United States, a prospectus is required to be filed with the Securities and Exchange Commission (SEC) as part of a registration statement. The issuer may not use the prospectus to finalize sales until the registration statement has been declared effective by the SEC, meaning it appears to comply on its face with the various rules governing disclosure.

In the context of an individual securities offering such as an initial public offering, a prospectus is distributed by underwriters or brokerages to potential investors (Ljungqvist, 2005).

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Public Commodity Funds

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For an investor, public commodity funds constitute an indirect investment in commodity futures. Investors can purchase shares of public commodity funds, which is similar to purchasing shares of mutual funds except that commodity funds buy and sell commodity futures instead of stocks and bonds. On the one hand, public commodity funds offer an opportunity for even small investors to participate easily in commodity markets since public commodity funds typically have low investment requirements and manage the rolling of the futures. On the other hand, the exposure to commodities is lower than in the case of holding long positions in commodity futures directly. Public commodity funds can also hold other financial instruments such as currencies and currency futures, financial futures, stocks of natural resource companies, etc. In addition, they

can be long or short in commodity futures; thus, the inflation hedge property inherent to most commodity futures is not necessarily incorporated in commodity funds and the correlation to commodity futures is on average insignificant (see Elton et al., 1987). Performance studies show that public commodity funds rely primarily on technical analysis and not on fundamental supply and demand factors, generally impose high management and incentive fees, and exhibit high volatility (see Elton et al., 1989). Furthermore, investors are generally only allowed to liquidate their fund shares at the last day of the month. Despite these drawbacks, several public commodity funds have been found to be advantageous both as stand-alone investments and as assets in traditional portfolios (see, e.g., Edwards and Liew, 1998).

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Public Market Equivalent (PME)

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In the alternative investment market, the internal rate of return (IRR) is an established metric to measure the performance of an investment, especially in illiquid investments such as private equity funds. Due to limitations of the IRR, the public market equivalent (PME) has been developed as another cash flow based relative performance measure.

The PME approach starts from the following question: Given that the investor invests—in terms of present value—$1 in a private equity fund, how many dollars would he have to invest in a given public market index in order to end up with the same terminal wealth? The PME is the answer to this question. It is the ratio of the terminal wealth obtained by investing in a private equity fund compared to the terminal wealth obtained when investing the same amount of money in a given public market index. The fund with better performance relative to such an index has the higher PME. Hence, the PME is a relative performance measure (Kaserer and Diller, 2004). It is defined as

$$\mathrm{PME} = \frac{\sum_{t=1}^{T} \mathrm{CF}_t \prod_{i=t+1}^{T} (1 + r_i)}{\prod_{t=1}^{T} (1 + r_t)}$$

where r_t is the net return of a public market index in period t, while CF_t is the normalized positive cash flow (distribution) of the private equity fund in period t. Normalization in this context means, that every single positive cash flow accruing in period 1 or later is divided by the present value of all investments, that is, the present value of all negative cash flows. Therefore, the cash flows are normalized to an initial investment with a present value of $1. The PME provides a robust measure which can account for more realistic and different reinvestment rates than assumed in IRR calculation.

Furthermore, investments of unequal size or investment period can be compared.

An alternative definition is given by Long and Nickles (1995), who calculate the PME as a dollar-weighted return that would have been achieved by replicating the funds' cash flow with a market index. Whenever the fund makes a capital call, the same amount is invested in an index. If the fund disburses cash, an identical amount of index shares is sold from the index portfolio to arrive at the same cash flow pattern. However, this procedure often leads to situations where the benchmark return does not make sense, or simply does not exist, as mentioned by Rouvinez (2003). When using this measure for all cases where the private equity portfolio outperforms the benchmark, the benchmark portfolio will eventually end up with negative values, that is, it must be shorted. Obviously, a comparison between a long private equity position and a short position in a public index does not make sense.

Rouvinez proposes an adaptation of PME, called PME+, which avoids the problem of short positions by selling a fixed proportion of positive cash flows, as opposed to the exact same amount as with standard PME. By adjusting the cash distribution by this scaling factor and matching private equity NAV and index-tracking fund NAV at the end of the benchmarking period, one can avoid an index short position while still retaining all positive aspects of PME.

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Public Offering

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Public offering is one way for firms to raise funds by selling securities to the public. In general, securities can be sold as a public issue or as a private issue. Private issue refers to the sale of securities to a few investors which does not require a registration statement with the SEC (or with similar institutions in other countries other than the U.S.). New issues of securities are sold to the public, with the help of investment banks, in primary markets, while existing-securities are traded in secondary markets. Public issues can either be "general cash offer" or the "rights offer." The first one indicates that issues are marketed to all investors, while the latter one indicates that shares are marketed to existing shareholders. Initial public offering (IPO), or unseasoned new issue, refers to the public issue of a privately held company to the public for the first time. All IPOs are cash offers. When new issues of stocks are marketed to the public for a company with previous public offering, it is called a seasoned new issue.

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Public to Private

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Public to private (P2P, or going private) is a transaction in which publicly owned stock in a firm is purchased by a private group, usually consisting of private equity houses or the existing management (management buyout [MBO]). The organizing sponsor group normally buys all the outstanding shares of the company. As a result, the firm's stock is taken off the market (an exchange-traded stock is delisted). After the purchase, the firm's capital structure has frequently substantial debt. P2P transactions are often leveraged buyouts (LBOs). The selling stockholders are regularly paid a premium above the market price (DeAngelo et al., 1984). Thus, the acquirers aim to increase the company's value by more than the premium paid. Furthermore, the P2P usually turns the previous managers into owners, thereby increasing their incentive to work hard. The management strives to increase profits and cash flows by cutting operating costs and optimizing strategies and processes (Weston et al., 2004). There are many different sources of gains generated by P2P, which are similar to the gains sources from buyout transactions. These include tax benefits, management incentives, wealth transfer to shareholders from other stakeholders or employees, asymmetrical information, and underpricing. A further major source of stockholder gains in P2P transactions is the mitigation of agency problems associated with free cash flow (Jensen, 1986).

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Public Venture Capital

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Public venture capital refers to the capital invested by governments in new firms, typically in the form of equity or equity-like investments, loans or even government grants. There are three rationales for public venture capital programs. The first rationale is that public venture capital programs can play a role in certifying new firms to outside investors (Lerner, 2002). According to this view, government programs can identify and support the creation of new firms in industries that do not attract private venture capital. Private venture capitalists herd themselves into particular industries at the expense of others. Government certification of promising firms can shift some of private venture capital into these neglected industries (Lerner, 2002; Secrieru and Vigneault, 2004). The second rationale for government intervention stems from the positive externality created through research and development (R&D), which makes the social rate of return on R&D expenditures to exceed

the private rate of return by a considerable amount (Griliches, 1992; Lerner, 2002; Secrieru and Vigneault, 2004). The third rationale for government venture capital programs is based on the empirical evidence that new entrepreneurs are liquidity-constrained. Liquidity constraints are caused by informational asymmetries between shareholders and managers, either of the adverse selection or moral hazard type. These informational asymmetries negatively affect the willingness of traditional investors (venture capitalists and banks) to invest in start-ups. Government venture capital investments can help to alleviate these liquidity constraints.

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Put Option

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A put option gives the holder the right, but not the obligation, to sell a specified amount of an underlying asset to another party at a fixed price over a specific period of time (American option). A European option can only be exercised at maturity, which makes it less valuable for an investor compared to an American option with the exact same parameters. The buyer of a put option estimates that the price of the underlying asset will decline over time below the exercise price (Long Put). The investor will then profit by either selling or exercising the option. The maximum profit is thereby limited to the exercise price less the premium when the value of the asset is declined to zero at the time of exercise. If investors write a put contract, they estimate that the price of an asset will stay above the exercise price (Short Put). They have the obligation to buy the asset whenever the buyer of the put exercises his right to sell. The profit is limited to the premium they receive from the buyer for the put contract. The maximum loss for the seller is equal to the exercise price less the premium received from the buyer. In both cases is the investor at a breakeven when the value of the asset is equal to the exercise price minus the premium (Kolb, 2000).

Strategies with options can be used, for example, to reduce an investor's exposure without selling the underlying stock position. The 'Protective Put' strategy requires the investor to buy a put for his long position which will provide downside protection in case the stock declines in value but will retain the upside potential of the stock position. This strategy, however, requires a payment of cash upfront for the premium (Hull, 2003).

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Pyramiding

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Pyramiding is the practice of using past successes to create additional value, even if the profits from past successes are not yet realized. In finance, this term has been used to describe the purchase of a security on the margin created by the increased valuation of previous purchases of the security in an investor's portfolio. This method to expand an investor's position in a security through unrealized gains has diminishing effectiveness because margin rules allow only a fraction of the increases to be used to purchase additional amounts of the security.

This term can more generally be applied to other business practices that allow for expansion through leverage of existing holdings. Pyramiding is typically used in a negative context because, if unconstrained, can result in a multiplier effect of paper purchases with little underlying value. For instance, in a 'pyramid scheme', the investment of late arrivers provide returns for those that subscribed earlier. Such ventures always require new capital to keep the enterprise viable. Little or no true value is created in such schemes, which invariably end in financial ruin. Margin rules restraining the level of extension of capital based on past paper gains are an effective way to reduce the multiplier effect that pyramiding relies upon.

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Q

Qualified Investor

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According to the regulation of the Securities and Exchange Commission (SEC), United States residents may invest in hedge funds only if they are qualified (or accredited) investors. To be a qualified investor, an individual must meet one of the following two criteria: First, the net worth of the individual (or joint net worth with his or her spouse) must exceed U.S. $1,000,000. Second, the net income of the individual must be more than U.S. $200,000 in each of the last two calendar years (or joint net income with his/her spouse in excess of U.S. $300,000 in each of these years). The income criterion also requires that the individual reasonably expects to reach the same income level in this year.

The reason for restricting hedge fund investments to qualified investors is that the people who meet these requirements should be able to evaluate the risk of investing in hedge funds and understand the underlying strategy. Furthermore, qualified investors should be able to bear the economic consequences of investing in hedge funds, including the risk of a total loss. However, these requirements are not directly designed for people wishing to invest in hedge funds; they also apply to investing in other complex and nontransparent securities, such as managed futures and venture capital funds. Comparable regulations in other countries are the "qualified investor register" of the British Financial Services Authority (FSA) and the "Register qualifizierter Anleger" of the German Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).

Quiet Filing

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A quiet filing is a filing by a company with the United States Securities and Exchange Commission (SEC) for an initial public offering (IPO) that omits certain relevant details. These details will subsequently be included

in amendments to the filing. Such quiet filings allow for preliminary information to become available in advance of further detailed information, thereby reducing the amount of subsequent paperwork. Once the required paperwork is assembled, the company can then complete the announcement of the IPO. This quiet filing ideally results in the publication of a preliminary prospectus, which initiates the process of marketing the IPO.

Quiet filings allow a company time to resolve such issues as the number or timing of shares to be offered to the marketplace or the naming of an underwriter for the new issue. It also offers the company some time to work with the SEC to resolve issues that would otherwise induce a protracted SEC review. In effect, the quiet filing is often little more than a successful registration statement that gives notice to the SEC about a future IPO and permits the SEC and the company to interact to move toward a successful IPO preliminary prospectus.

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Quiet Period

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Reeling from the Stock Market Crash on Tuesday, October 29, 1929, the U.S. Congress passed the Securities Act of 1933 and the Securities Exchange Act of 1934 to restore confidence in U.S. financial markets. The 1934 Act contained a quiet period provision that restricted the information released about an initial public offering (IPO) to the prospectus that is filed with and approved by the Securities and Exchange Commission (SEC). The process of developing the final prospectus starts with the preliminary prospectus or "red herring." The term "red herring" came into use because of the attention-drawing statement on the first page of the preliminary prospectus in red stating that the company is not attempting to sell the stock therein discussed before the final prospectus is approved by the SEC. The quiet period was initially 5 days prior to the IPO offer date and 25 days postoffering. In 2002, the postoffering period was lengthened to 30 days. During this time, those parties with an economic interest in the IPO who have creditable information sources were prohibited from making IPO-related information available that was not part of the public information in the SEC-approved prospectus. The intent of the quiet period was clear: to eliminate prelaunch hype. Such prelaunch restrictions got to be called "gun-jumping rules" as it was believed that discussing the IPO during this period was inappropriate. In 2005, the SEC brought the quiet period to an end by eliminating restrictions on disclosure of any information that was outside the official prospectus. This was surprising because the SEC had been very vigilant and often erred on the side of strict interpretation in order to guard the sanctity of the quiet period. Just consider the brouhaha over Google's *Playboy* interview where Sergey Brin and Larry Page said a "few" nice things regarding the then about to be launched Google IPO. The SEC started muttering about imposing

a "cooling off" period that would delay Google's debut or perhaps require Google to buy back shares.

In 2007, some 2 years after the SEC eliminated the quiet period, has the IPO crowd pumped up the volume? Surprisingly, no! According to Lynn Cowan, "Among the changes adopted by the SEC in June 2005 is a provision that allows companies more flexibility in speaking publicly to the media before an initial public offering. In practice, however, very few companies opt to grant interviews with their executives ahead of a deal because they still risk liability for any false statements. 'The feeling is, why take the chance that someone will misunderstand you? You will still find that CEOs are very cautious about talking to the media' ahead of an IPO,' says Brian Lane, a lawyer at Gibson, Dunn & Crutcher LLP and a former SEC corporation-finance division director." (*Wall Street Journal*, January 29, 2007, online.wsj.com). So a self-imposed version of the quiet period seems to still exist from *management's* perspective. But the story continues: Bradley et al. (2003) found that at the close of the quiet period, 76% of the analysts immediately initiated coverage with "buy" recommendations in their general as well as tombstone placements. Further, this hype seemed to work as the 5-day abnormal returns for these securities was 4.1% compared to a benchmark of firms with no such coverage for which the abnormal return was only 0.1%. Given these abnormal returns, it is indeed surprising that management remains reticent. Perhaps, they feel that the analyst's hype is sufficient and so they do not need to take the risk of saying anything.

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R

Ranking

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The ranking of a hedge fund refers to its position relative to other hedge funds on a performance basis. There are many ways to rank hedge funds. When reporting their performance, hedge fund managers usually only give their short-term returns and their yearly returns over the last 5 years. But this reporting is incomplete because it does not account for risk. Another indicator of performance that is very popular for hedge funds is their alpha (i.e., alpha is a measure of absolute performance). Studies show that hedge funds usually have alphas that are too high when compared to the market efficiency hypothesis. However, the estimation of alpha is quite questionable. First, it is a measure associated with a factor model, and the results may differ greatly from one model specification to another. Second, studies on hedge funds often neglect the specification errors related to the estimation of a model (Racicot and Théoret, 2006; Théoret and Racicot, 2007). Neglecting these errors may greatly bias the estimation of alpha. Besides, the financial literature that ranks hedge funds on a risk-return basis resorts more to the indicators of downside risk, such as semivariance, semideviation, and shortfall risk measures. The literature recently seems to be more concerned with fat-tail risk (Lhabitant, 2006). Finally, many reports rank hedge fund by percentiles, which allows visualizing on a chart, the relative position of a hedge fund in its category.

Ranking has another meaning in finance. It refers to the status of a security issue of a company relative to another, such as debt. Debt may be subordinated or junior to another, which implies that in case of bankruptcy, the holders of senior debt will be repaid before the holders of junior or subordinated debt. As suggested by Teweles and Bradley (1982), common stock may also be classified in the form of class A and class B shares. According to these authors, the difference in class A and class B stocks is generally voting rights: class A has voting rights and class B has no voting rights. However, there is no uniform format regarding this classification. The term "ranking" often appears in the prospectus of a security issue. For instance, in the information statement of an issue of managed futures notes, prepared by the Business Development Bank of Canada, on December 2002,

the following was noted in the ranking section: "The notes will rank pari passu, with any preference among themselves, with all other outstanding, direct, unsecured and unsubordinated obligations, present and future." In its prospectus, a company must thus specify the legal priority of an issue over the former ones (BDC, 2002).

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Ratchets

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A ratchet clause refers to an antidilution protection mechanism in the investment contract that investors employ to protect themselves from a dilution of the equity that results from a later issue of stock at a lower price than the investor had originally paid. There are two principal types of antidilution mechanisms: full ratchets and partial ratchets, the latter also being called weighted average ratchets. If a company sells equity at a price below that of a previous issue, a full ratchet clause will oblige the company to adjust the price of the outstanding preferred stock to the dilutive price of the new issue, regardless of the amount of stock sold at that price.

With the new conversion ratio, all investors' shares are treated as if they were bought at the lower price of the later issue:

$$\text{New conversion ratio} = \frac{\text{original (or adjusted) price}}{\text{price at which the diluting shares were allotted}}$$

Oren and Geiger (2002, pp. 146–147).

A ratchet clause is an important option for early investors to reprice their shares to market prices at a later date when the value of the company may be assessed on better information.

When a company, however, is in need of capital during a downturn in the financial markets, a full ratchet will hit the company even harder. With the smaller number in the denominator, the new conversion ratio could mean a substantial adjustment in the ownership of the company as it leverages the number of shares held by investors who acquired the stock at the lower price.

EXAMPLE

An investor invested \$1 million according to a premoney value of \$4 million (the company had 4,000,000 shares before the allotment) and received 1,000,000 preferred shares (i.e., 20% of a company now worth \$5 million). The company now raises \$250,000 at a price per share of \$0.50 (i.e., to allot 500,000 additional shares). "The New Conversion Ratio is therefore 1/0.50 = 2, and the first investor can convert his or her shares into

2,000,000 regular shares, which would constitute more than 30% of the company's equity (2,000,000 out of 6,500,000)." Oren and Geiger (2002, pp. 146–147). In order to mitigate the impact on the company, full ratchets are often limited to a set period of time or a limited number of financing rounds. Negative effects of triggered ratchets can also be limited by setting a floor on the conversion ratio.

The most commonly used mechanism that is considered more equitable for both parties is a weighted average ratchet. In adjusting the conversion ratio in accordance to a weighted average price, the weighted average ratchet takes into account the lower price as well as the number of shares that are being issued at the lower price. This value is then averaged by the total number of shares outstanding after the dilution.

$$\text{New weight price} = \frac{(\text{current price} \times \text{new shares}) + (\text{previous price} \times \text{previous share})}{\text{new shares} + \text{previous share}}$$

$$\text{New conversion ratio} = \frac{\text{original (or adjusted) price}}{\text{new weighted price}}$$

Using the data from the previous example the New Weighted Price is 0.954, and the New Conversion Ratio is 1.05. The investor will therefore be compensated for the diluting issuance by receiving an amount of 50,000 additional shares in comparison to 1,000,000 shares in the full ratchet example (Oren and Geiger, 2002, pp. 147–148).

Spreading the dilution effect over the total number of shares outstanding is called broad-based weighted average antidilution protection. Sometimes, venture capitalists and companies agree to narrow the number of shares being considered as the base in the weighted average formula. In doing so, a narrow-based ratchet might exclude unconverted preferred stock or unexercised options and only consider the number of preferred shares outstanding prior to the financing.

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Real Option Approach

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The real option approach considers managerial flexibility through identifying and valuing future options of the management. Four categories of real options can be differentiated. With the option to adjust production, the management can choose the scale, scope, lifetime, or the inputs for its production. The option to defer investment allows the management to put projects on hold until market conditions have changed preferably. With the option to abandon, the management can bail out of unsuccessful projects to recover the liquidation value. Stage investments lead to follow-on options that have the structure of compound options. Each successful investment stage thus leads to the option to continue with the next stage.

The valuation of real options is based on pricing models for financial options, for example, the binomial model or the Black/Scholes model. They are based on the concept of constructing a replicating portfolio of priced securities that have the same payouts as the option. The management designs the structure and characteristics of its real options. As the underlying asset of a real option is not publicly traded, the parameters required to use the option pricing models are difficult to estimate. In addition, interaction effects between different real options and competition effects have to be considered when valuing real options. Therefore, real option valuation is highly complex. Even though quantification is difficult, the real option approach is a useful strategic management tool to identify future managerial options.

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Recap Buyout

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A recap buyout is a buyout transaction that stipulates a mechanism that enables the vendor to buyback the entire company at predefined conditions. A recap buyout is similar to a combination of a buyout and a buyback as exit. In a recap buyout, the conditions of the buyback are stipulated at the buyout while a regular buyback does not clearly envisage these conditions. These conditions compensate for the preselection of the exit channel, which limits the private equity company's return potential. Therefore, in the buyout negotiations, the underlying company will be priced conservatively and an exit valuation will be determined at an early stage of the investment.

Ownership buyouts are especially designed for buyouts in former family businesses (or owner-managed businesses). This buyout type offers the family the possibility to regain control while withdrawing a share of the family wealth from the family business. In addition, the transaction setup enables a reorganization of the ownership structure (e.g., if ownership is widely dispersed before the buyout or if one family clan or co-owner is to be paid out but the remaining owners cannot afford this payment at the moment of leaving).

Recapitalization

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Recapitalization can be referred to as a process of change in a company's capital structure. Companies may want to

issue new equities to improve liquidity, or debt ratings by decreasing financial leverage. The opposite can be observed in many private equity transactions. A "recap" or leveraged recapitalization in private equity-controlled companies is often defined as increasing the debt to equity ratio. Cash is generated during the lifetime of the investment while maintaining significant ownership in the portfolio company. In a dividend recap, a financial sponsor takes over a company or restructures an already owned company. By arranging new senior bank debt and perhaps subordinated debt or mezzanine that replaces equity, the financial sponsor generates excess cash, which is then paid out as an extra dividend. The financial sponsor can use this technique to boost its rate of return (i.e., IRR) due to higher leverage and the tax shield on interest expenses; however, such a strategy also increases risk. Therefore, recapitalizations are very attractive for companies with positive future prospects. Financial sponsors usually look for companies with long track records, constant or increasing revenues and earnings, as well as an optimistic forecast to limit their downside risk. The risk can be substantial, if interest rates change or the business environment becomes unfavorable.

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Red Herring

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"Red herring" is a preliminary registration submitted to the Securities and Exchange Commission (SEC) by the companies intending public offerings of securities. It outlines the important information about the new issue, including proposed price range and balance sheet and other relevant financial information about the company. Outside the United States, it is sometimes called the "pathfinder prospectus." This preliminary prospectus is referred to as a red herring because it contains the following warning, generally in red ink:

> The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and we are not soliciting any offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

The Securities Act of 1933 makes it illegal in the United States to sell securities to the public without first registering with the SEC. Once the registration statement is filed with SEC, a shorter version of the statement (red herring) is created. It is a provisional statement that includes all the information about the company apart from the exact offer price and the effective date. Since the registration and marketing process can take several months, providing information on the exact price and effective date is impossible; thus, it generally includes

a price range. Red herring is then sent to potential investors around the country. At this period no written sales literature other than "tombstones ads" and red herring are permitted by SEC. Unlike Europe, in the United States the analyst reports are strictly forbidden before SEC approves the registration. During the marketing period, investors evaluate the issue. The demand for the offer is estimated and the final issue price is set based on the bids and feedbacks (Ellis et al., 1999). If this price is not within the preliminary price range in red herring, a revision is made indicating a new price range. Indeed, since the price range in red herring is prepared prior to getting feedback from potential investors, the final price in the United States is often outside of the initial price range in the red herring document (Jenkinson et al., 2006). Once SEC approves the registration statement, it becomes effective and trading is allowed.

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Redemption Period

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Hedge funds typically limit subscription and redemption possibilities by specifying the dates at which investors can enter the fund, by determining a minimum investment period, the so-called lockup, and by specifying the terms of redemption. The redemption period determines the frequency with which investors can withdraw money from the hedge fund. Currently, the most common redemption periods are at the end of a month or at the end of a quarter, although we occasionally see much longer periods (e.g., 1 year), particularly for funds investing in rather illiquid markets or securities. Redemption periods are often combined with redemption notice periods that specify how many days in advance investors have to notify that they wish to redeem. Typically, the notice period is between 30 and 90 days. In addition, hedge funds may impose further restrictions upon redemption, for example, by limiting the number of shares that can be redeemed at any given date or by imposing penalty fees for early redemption. (See Lhabitant, 2002, Chapter 1, for more discussion.) Combined, restrictions on redemption limit the possibilities of investors to quickly respond to poor past performance of a hedge fund by withdrawing their money. Occasionally, it can take up to six quarters before a desired redemption can be effective. Aragon (2007) investigates the relation between hedge fund returns and restrictions that limit the liquidity of fund investors. His results suggest that share restrictions allow funds to efficiently manage illiquid assets, and these benefits are captured by investors as an illiquidity premium.

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Registration Statement

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A registration statement is a part of the process of registering securities in the United States. Many other countries follow similar procedures. The registration process is controlled by the Securities Act of 1933, so called because it defines the rules for securities disclosure. One of the key provisions of the Securities Act is that the sale of securities in a state must comply with the laws and regulations for that state, even if the securities transaction involved interstate commerce.

Note that most of the Securities Act rules do not apply to unregistered securities (including most hedge funds, commodity pools, private equity partnerships, privately placed stock, bonds, and loans, and many real estate investments). Other laws govern commodities, investment management, broker-dealers, and pension plans.

The registration statement is filed with the Securities and Exchange Commission (SEC). This statement contains information about the issue and the issuing company, as a disclosure to potential investors. The registration is often called a "red herring" because it contains bold sections in red type, reflecting the preliminary nature of the document. This early document is not considered an adequate disclosure to actual investors, so it must contain a disclaimer announcing that it is not a solicitation to sell securities.

Issuers observe a "quiet period" beginning when the registration statement is delivered to the SEC for approval until the SEC declares the registration to be effective. During the quiet period, companies face limits on communication with the public.

Potential investors may receive a copy of the registration statement or an offering circular, which includes few of the risk disclosures but describes the important terms of the expected offering. As more details are documented, the registration statement is revised, sometimes several times. A final version of the registration statement includes a prospectus, a lengthy risk disclosure document. All investors who purchase a registered security should be provided with a copy of the final prospectus.

Beginning in 1982–1983, the SEC created an expedited way to sell registered securities. SEC Rule 415 allows a company to complete the registration requirements with the SEC up to 2 years before the security is issued. This rule allows a company to delay the pricing and issuance of securities to a later time. Companies may complete a shelf registration statement before they have any intention to issue securities, so that they can quickly respond to market conditions. The rule also permits a company to continuously sell securities under the shelf registration.

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Regulation D Fund

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Regulation D (Reg D) is a U.S. regulation that organizes the limited offer and sale

of securities without registration under the Securities Act of 1933. It provides three exemptions from the Securities and Exchange Commission's (SEC) registration requirements, which allow smaller companies to offer and sell their securities very quickly, at low cost, and with lower disclosure requirements than standard public offerings. Most domestic U.S. hedge funds rely on Reg D to place their securities directly to a selected group of investors.

Furthermore, Reg D offerings provide investment opportunities for hedge funds and thus build a hedge fund strategy. A Reg D fund invests in companies that are raising money using Reg D. This means that these funds are primarily holding illiquid positions in small-capitalized companies. Depending on whether equity or convertible bonds are issued, investments take one of two forms. In an equity issue, the hedge fund buys the stocks of the offering company at a discount with respect to the current market price. The stocks are not registered on an exchange and the investor has to observe a holding period before the stocks can be sold on the stock market. During the holding period, the stocks can only be traded among accredited investors, so that there is hardly any liquidity. In a convertible issue, the investors purchase a convertible bond that can be converted into a specific number of shares at a predetermined price.

The Reg D companies often need immediate financing and offer very attractive conditions to investors. The profit the hedge fund manager tries to capture is the discount between the purchase price and the market value of the publicly traded stocks at issue.

Regulation D Offering

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The regulatory basis for offering and selling securities is the Securities Act of 1933, including rules (§§ 230.501–230.508) that govern the limited offer and sale of securities without registration. The latter is known as Regulation D. Common securities of Regulation D offerings are equity and convertible bonds. Besides Regulation D, there are other exempts from registration, such as for the issue of insurance policies and short-term commercial papers or securities issued by governments, nonprofit groups, common carriers, and banks (Greene, Rosen, Silverman, Braverman and Sperber, 2004). According to the Securities Exchange Act of 1934, companies with more than 500 shareholders, $10 million assets, or those listed on national stock exchanges are required to register. An investment strategy based on these issues is also known as Regulation D investment or PIPE investments (private investments in public entities).

Despite its complexity, Regulation D is an easy method of financing for small companies. Rule 501 provides several definitions, which are applied in rules 504, 505, and 506.

According to Rule 501, (i) accredited investors are typical institutional investors (such as banks, brokers, insurance companies, pension funds, and trusts), private development companies, members of the (top) management of the issuer, and individuals with a net worth of about $1 million

or an income of about $200,000 in the two most recent years. (ii) Companies can be issuers, or in case of reorganization, also the trustee or debtor. (iii) The calculation of the number of nonaccredited investors is also ruled.

Rule 502 determines general conditions for Regulation D offerings. (i) The issuer has to inquire whether the purchaser acquires the securities for his own or a third party's account and the purchaser should not be an underwriter. (ii) The issuer must notify purchasers that securities are not registered under the Security Act and therefore cannot be resold. (iii) General solicitation and advertisement are not allowed. (ix) Just as in registered offerings, documents for nonaccredited investors have to be disclosed. Any information for accredited investors can be made as long as these meet antifraud provisions. All information for accredited investors must be disclosed to nonaccredited investors as well. (x) The issuer must be available to answer questions by prospective purchasers. (xi) For nonaccredited investors a certified financial statement must be provided by an independent public accountant (in some cases the company's balance sheet or the audited financial statements prepared under the federal income tax laws are sufficient).

Rule 503 specifies the filing of notice of sale (505/506). Within 15 days after the first sale of securities, the issuer has to file Form D to the SEC, which includes names and addresses of the company's owners and stock promoters. Registration of securities and sending of reports to the SEC are not required.

Three exemptions for limited offerings and sales without registration are named in rules 504, 505, and 506.

Rule 504 exempts offers and sales of securities that do not exceed $1 million in any 12 month period. Before the small business initiatives (August 1992), the general rules 501, 502, and 503 have to be met. Thereafter, under certain conditions there can be a public offering of securities up to $1 million to an unlimited number of investors of any kind, without delivery of disclosure documents. It is required that the issuer is not a blank check company and does not have to file reports accordingly to the Securities Exchange Act of 1934. In some cases, state security laws may be stricter. Antifraud provisions have to be abided. This means no including or excluding of information that would be false or misleading.

Rule 505 provides the exemption for offers and sales of securities not exceeding $5 million in any 12 month period. An unlimited number of accredited investors and 35 nonaccredited investors are able to buy the offered securities. The definitions (rule 501), the general conditions (rule 502), and the filing of notice of sale (rule 503) have to be met.

Rule 506 provides the exemption for unlimited offers and sales of securities. It is considered as a safe harbor for private offering that arises under Section 4(2) of the Security Act (504 and 505 are small offerings). An unlimited number of accredited investors and 35 nonaccredited investors are able to buy the offered securities while nonaccredited investors have to understand the merits and risks of the investment. Again all definitions (rule 501), general conditions (rule 502), and the filing of notice of sale (rule 503) have to be met.

Compared to full SEC registration, a Regulation D offering has the advantage to

be easier, faster, and cheaper (Anson, 2001). Furthermore the issuer is in safe harbor (legal protection) if all requirements are fulfilled. For small companies, which are fast growing, have large expenses (R&D), or run out of liquidity, Regulation D provides fast new capital. Under unfavorable market conditions or restructuring, (secondary) public offerings are often not possible for small and unknown companies. In the past, high-tech, Internet, and biotechnology companies used Regulation D intensely. The danger of losing control of the company exists when toxic PIPEs occur. Toxic PIPE refers to a situation when convertible bonds are issued and the conversion ratio depends on the future equity price. Through short selling of the equity, the purchaser of the convertible bond reduces the equity price and receives more (in some cases the majority) shares.

Investors of Regulation D offerings often receive a discount on the security price due to the restriction on reselling them. Moreover it is possible to invest in growing businesses in early stages. The risks of such an investment are illiquidity, uncertain business model of a small company, and the voluntary nature of information received (Feldman, 2006).

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Relative Value Arbitrage

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Relative value arbitrage not only defines a single strategy but also the combination of all arbitrage strategies such as merger arbitrage, fixed-income arbitrage (credit spread arbitrage, capital structure arbitrage, yield curve arbitrage, mortgage-backed securities arbitrage), volatility arbitrage, index arbitrage, split strike conversions, statistical arbitrage, stub trading, and convertible arbitrage (Ineichen, 2003). Hedge fund managers pertaining to this strategy group execute spread trades to generate positive returns from relative price discrepancies among securities or financial instruments such as equities, fixed income, convertible bonds, options, subscription rights, and futures while simultaneously avoiding market risks. Here a spread denotes the deviation of a security from its theoretical/fair value and its historical average or from the economic relation of two correlated securities. Once these temporary price anomalies are identified through statistical or fundamental analysis, the overvalued security is sold and simultaneously the undervalued security is purchased, taking into account the respective hedge ratio (Anson, 2002). Upon a closer examination, the investments on the relative price relation between two securities independent from the current capital market condition lead to

a minimization of directional bias—hence relative value arbitrage hedge funds are also known as "market neutral" hedge funds. If after spread trading, beta or market risk still remains, it can be neutralized through options or futures. However, market neutral must not be confused with no risk, as demonstrated in 1998 with the collapse of the widely known relative value hedge fund Long-Term Capital Management (LTCM). In the current high technology era the spreads based on the violation of one price are very small and only of short-term existence; thus, hedge fund managers try to leverage their returns up to 100 times the company capital (Nicolas, 1999). As a result, the credit risk included rises as well. Relative value arbitrage generates profit as soon as the prices of the traded securities revert to their historical average. Particularly in extreme market situations based on euphoria or panic, it may take a very long time until the prices based on the efficient market hypotheses are reached again. Conversely, it is possible as well for the price anomalies to widen. Investigations of the performance of relative value arbitrage indices of important database providers show moderate but stable profits with a low correlation toward equity markets. Considering the return distribution, we nevertheless observe fat downside tails, leptokurtosis, and substantial negative skewness (Heidorn et al., 2006).

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Reportable Position

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"A reportable position is an open contract position that has to be reported if at the close of the market on any business day it equals or exceeds a reportable limit in either (1) any one future of any commodity on any one contract market, excluding futures contracts against which notices of delivery have been stopped by a trader or issued by the clearing organization of a contract market, or (2) put or call options (short or long) exercising into the same future of any commodity on any one contract market" (17CFR15.00(k)(1), 2007). The reportable limit denotes the number of contracts at which traders have to report their total positions within a business day to the Commodity Futures Trading Commission (CFTC) (Anderson, 2006). The report filled by a trader who owns, holds, or controls a reportable futures or options position in a commodity shall obtain the following: (a) open contracts; (b) delivery notices issued and stopped; (c) purchases and sales of futures for commodities or for derivatives positions; and (d) options exercised (17CFR18.00, 2007). The CFTC determines the reportable limits for each commodity. A normal reporting level is 25 contracts at which traders are already considered as large traders. The number of

contracts underlying the reportable limit is considerably lower than those underlying the position limit. Hedgers are not concerned of a reportable limit because of their economic needs (Anderson, 2006). Any commodity future or option account that has a reportable position is called a special account (17CFR15.00(n), 2007).

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Reporting Guidelines

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Reporting guidelines give private equity funds detailed recommendations about the disclosure of additional information to investors. They aim to homogenize the information for investors, increase transparency, and thus improve trust and confidence between general partners and investors. Two main reporting guidelines have been developed in the past.

For Europe, the European Venture Capital Association (EVCA) first introduced industry-reporting guidelines in March 2000, which were updated in June 2006. EVCA distinguishes between requirements that fund managers have to report if they claim compliance with the guidelines and recommendations that must not necessarily be followed. Semiannual reports are required; quarterly reports are recommended.

For the United States, the Private Equity Industry Guidelines Group (PEIGG) issued reporting and performance measurement guidelines in March 2005, which were developed under the participation of the British Venture Capital Association (BVCA) and EVCA. PEIGG guidelines require quarterly reporting. Both EVCA and PEIGG industry-reporting guidelines do not address financial statements of private equity funds but intend to promote additional information on fund level, including capital accounts.

Although on fund level, the information requirements of EVCA and PEIGG are quite similar, EVCA guidelines require much more reporting on portfolio company level, for example, location of head office, business description, co-investors. Interestingly, concerning portfolio companies' balance sheet items, securities ownership and valuation, and other performance metrics, PEIGG guidelines are more precise than EVCA guidelines (cf. EVCA, 2006; Private Equity Industry Guidelines Group, 2005; Müller, 2008). For reasons of completeness, the private equity provisions of the Global Investment Performance Standards (GIPS) issued by the CFA institute in February 2005 should be mentioned, although they focus primarily on fundraising rather than permanent reporting during the fund's lifetime.

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Return-Based Style Factors

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Return-based style factors are non-observed variables that are extracted from fund returns. Hedge funds that pursue similar strategies or invest in the same asset universes are expected to exhibit returns that are correlated. The idea of return-based style factors is to determine a parsimonious set of driving factors that explain a large fraction of the variation in returns of a given group of hedge funds. This procedure allows reducing the multidimensional cross-section of hedge fund returns to a smaller number of factors that describes the common risk characteristics well. Typically, principal component analysis is used to find these implicit, common style factors. The first principal component accounts for as much of the variation in the sample of hedge fund returns as possible. Then, the second principal component is determined to account for as much of the remaining variation as possible, and so on. Alternative techniques also account for higher moments. By construction, the principal components are mutually orthogonal to each other.

Table 1 summarizes the results on return-based style factors for three different samples of hedge funds. The columns show the percentages of the variation in the hedge fund returns that are explained by up to three principal components. Fung and Hsieh (1997a) extract five principal components that explain 43% of the return variance for a database of 409 hedge funds and commodity trading advisor (CTA) pools during 1993–1995. For a sample of 72 CTAs, Fung and Hsieh (1997b) conclude

TABLE 1

The Explanatory Power of Principal Components

Study	Style	Database	Sample Period	No. of Obs.	Cross-Sectional Variation Explained by Principal Components (%)		
					1st	2nd	3rd
Fung and Hsieh (1997a)	Hedge funds, CTA pools	Tass, Paradigm LDC	1993–1995	409	12	10	9
Fung and Hsieh (1997b)	CTA pools	Tass	1987–1995	75	36	8	6
Fung and Hsieh (2002)	Convertible bond	Hedge Fund Research (HFR)	1998–2000	12	59	13	—
	High-yield bond			20	63	16	—
	Mortgage-backed			17	55	17	—
	Fixed-income arbitrage			19	33	24	16
	Fixed-income diversified			39	36	21	11

Note: The table describes the sample of hedge funds used in three hedge fund studies that implement return-based style factors: Type of funds included in the study, data source, sample period, and the number of observations. The last three columns summarize the percentages of the cross-sectional variation in hedge fund returns that are explained by the first three principal components.

that one dominant principal component describes 36% of the cross-sectional variance in returns over the period 1987–1995. Another example is Fung and Hsieh (2002) who extract return-based style factors from monthly fixed-income hedge fund returns. They find that convertible bond, high-yield bond, and mortgage-backed securities hedge fund strategies are driven by one common factor that explains more than 50% of the cross-sectional variation. For arbitrage and diversified fixed-income strategies, however, two to three principal components are needed to explain more than half of the cross-sectional variation.

A critique of return-based style factors is that they lack an economic interpretation and are not investable. In contrast to return-based style factors, asset-based style factors are explicit and observable, such as stock and bond market indices, and often traded asset returns, such as options. The counterparts for implicit factor models such as principal component analysis are explicit factor models such as the capital asset pricing model (CAPM), the Fama-French three-factor model, or its extension that includes a momentum factor. To determine what the implicit return-based style factors proxy for, they are often related to asset-based style factors. This can be done using correlations, regression analysis, or Sharpe's (1992) return-based style analysis, which is essentially a constrained regression without intercept, where all the factor loadings are positive and sum up to one. Fung and Hsieh (1997a) find that one of the five principal components they extract from their broad sample of hedge funds is highly correlated with the returns on high-yield bonds and therefore represents the style of a distressed securities investment strategy. In this study, instead of directly using the principal components, the authors construct portfolios of the hedge funds and CTAs that are highly correlated with the first five principal components. They also show that the primary return-based style factor for hedge funds which use technical trading rules to profit from market events (opportunistic) and the style factor for trend followers are weakly correlated with major stock and bond asset classes. The R^2 with the standard asset classes in Sharpe (1992), augmented by high-yield bonds, are only 0.28 for the opportunistic style factor and 0.17 for trend followers. These last two examples show why return-based style factors have attracted a lot of interest as an alternative to asset-based style factors or as a complement.

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Reverse Crush Spread

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In the soybean industry, the term "crush" refers to both a physical process and a value creation process. The physical process converts soybeans into the processed products soybean meal and soybean oil, which are further processed into different end products.

The crush spread in the financial sphere is the difference between the value of the processed products and the cost of the raw soybeans. This value is traded in the cash or futures markets on the basis of expectations of future soybean price movements versus the price movements of the processed products. The relationship between prices in the cash market is commonly referred to as the gross processing margin (GPM), which is the difference between the cost of a commodity and the combined sales income of its end products.

The crush spread traded in the futures market is an intercommodity spread transaction. Intercommodity spreads are combinations of futures with different but related underlying instruments that exhibit highly correlated price patterns (e.g., maize and feeder cattle). Another intercommodity spread related to the crush spread is the so-called "crack spread," which is the ratio between crude oil and its principal refined products, such as gasoline and heating oil. The (reverse) crush spread consequently refers to a position where soybean futures are bought (sold), and soybean meal and oil futures are sold (bought).

We can calculate the crush spread as follows (see the CBOT® Soybean Crush brochure, 2006 for more details):

July 2007 soybean futures:
$8.91 per bushel (5000 bushels)

July 2007 soybean meal futures:
$245.70 per short ton (100 short tons)

July 2007 soybean oil futures:
$0.3756 per pound (60,000 pounds)

The next step is conversion into dollars per bushel:

Soybean meal $\$245.70 \times 0.022$
$= \$5.41$ per bushel

Soybean oil $\$0.3756 \times 11 = \$4.13$ per bushel

Finally, we calculate the crush spread as follows:

Soybean meal + soybean oil:	\$9.54
− Soybeans	\$8.91
=	\$0.63

The crush spread has been studied in several papers aiming to identify arbitrage opportunities for traders (see Mitchell, 2007, for an extensive overview). In 2006, the Chicago Board of Trade launched a new CBOT soybean crush spread option contract that allows market participants to enter a crush spread using a single contract, without margin requirements.

The crush spread is often used by processors to hedge the purchase price of soybeans against the sale price of soybean meal and oil. It also provides potentially lucrative opportunities to speculators, because the spread relationship between the raw material and its products varies over time. For example, the November/December crush (buying/selling November soybeans and selling/buying December soybean meal and oil futures) is used to hedge new crop gross processing margins, because the November/December prices often reflect the market's perception of conditions in the new soybean crop year.

Many seasonal, cyclical, and fundamental factors also affect the soybean crush spread. For example, soybean prices are typically lowest at harvest, but increase during the year as storage, interest, and insurance costs accumulate over time. Other factors include changes in demand for high protein feed over the course of the year, the decrease of South American soybean stocks during the late fall

and winter months, variations in crop size, yields and world demand, carryover stocks, Malaysian palm oil production, government programs, and weather. Fundamental and technical analyses can be used to help forecast the potential for repetitive market behavior, but many of the elements that affect the crush spread are unpredictable.

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Reverse Leveraged Buyout

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A leveraged buyout transaction of a publicly listed firm that is taken private by a later stage private equity fund (buyout fund) is called going private. The phenomenon of an initial public offering (IPO) of a former public firm after some value enhancing years in the portfolio of a later stage private equity fund is called a reverse leveraged buyout (RLBO).

Owing to comparable good data availability, there are some empirical investigations about the long-run performance of U.S. reverse leveraged buyouts in the 1980s (e.g., Degeorge and Zeckhauser, 1993; Holthausen and Larcker, 1996; Mian and Rosenfeld, 1993) and for larger samples over the period 1980–2000 (Cao and Lerner, 2006; Chou et al., 2006). In contrast to the widely documented poor stock prize performance of IPOs and seasoned equity offerings (e.g., Ritter and Welch, 2002, for a survey), all authors find no underperformance subsequent to the IPO for reverse leveraged buyouts. The results are robust for both market and accounting performance. The results indicate that private equity funds are concerned about the post-IPO performance of their investments since they are repeated players in the IPO market and hold a significant ownership stake in the public firms subsequent to the IPO.

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Right of First Refusal

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This is a contractual right to enter a business transaction granted by an owner to a potential buyer or investor. The holder of

this right is the first party, before anyone else, to be offered the deal, that is, the option of accepting or rejecting a contract with the owner. Only when the holder turns down the deal is the owner allowed to make the purchase or offer investment opportunity to other potential buyers or investors. For example, a startup company is obliged to offer its investment opportunities first to the venture capitalist that holds the right of first refusal. If rejected, the company can then shop around for other potential investors. Thus, the holder of the right of first refusal is always the first party to make an offer or a refusal to invest. In addition to being used in private equity, the right of first refusal also applies to many other types of assets such as real estate. Note that the right of first refusal is distinct from the right of first offer. The latter only requires the owner to engage in exclusive, good faith negotiations with the right holder before turning to other parties while the former is an offer to enter a contract on exact or approximate terms.

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Risk Arbitrage

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Risk arbitrage is a hedge fund investment strategy that attempts to profit from the arbitrage spread in mergers and acquisition. Thus, this strategy is also often called merger arbitrage. After a merger or an acquisition is announced, the target company's stock mostly trades at a discount to the price offered by the acquirer. The reason for this is that there is no guarantee that the merger will be completed. The difference between the offer price and the target's stock price is the arbitrage spread that risk arbitrageurs try to capture. If the merger is successful, the arbitrageur receives the arbitrage spread. If the merger fails, the arbitrageur incurs a loss.

There are two types of mergers: cash and stock. In a cash merger, the acquiring company offers to purchase the shares of the target company for a certain amount of cash. Afterward, the target's stocks trade at a discount to the offer price. In this situation, the risk arbitrageur buys stocks of the target. He gains if the merger is successful and the acquirer buys the stocks. In a stock merger, the acquirer announces a plan to exchange stocks of the target company in own stocks in a certain exchange ratio. In this situation, the risk arbitrageur buys stocks of the target company and might go short in stocks of the acquiring company. If the merger is successfully completed, the target's stock are converted into the acquirer's stocks based on the given exchange ratio and the hedge fund manager again captures the arbitrage spread.

As it is necessary to build up a long position in the target company and (in case of a stock merger) maybe also a short position in the acquiring company, the liquidity of the stocks involved in merger and acquisition is of great importance for a successful risk arbitrage. In addition, analysis of the legal situation is necessary, because the approval of the responsible regulator is one of the main impediments to many merger and acquisition transactions.

Risk arbitrage is a typical example of an event-driven strategy. It contains elements of many other hedge fund investment strategies, such as relative value, convertible arbitrage, volatility arbitrage, and statistical arbitrage. Some authors also consider other trading opportunities in the company's life cycle as forms of risk arbitrage. To these situations belong stock index reconstructions or stock repurchases, which might offer interesting arbitrage opportunities.

Roadshow

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In the process of an IPO, or seasoned equity or bond issue, the roadshow is the moment when the initiative is presented to an audience of institutional investors; the aim is to draw attention to and excite interest in the security offering that will follow (Benveniste and Spindt, 1989; Schulte and Spencer, 2000). A roadshow (also known as a "dog and pony show") is made up of a series of meetings in which the intermediary or intermediaries that handle the issue (bookrunners) introduce the company's management team and its development projects and business plan to a more or less limited number of institutional investors, portfolio managers, and financial analysts. The aim is to facilitate placement of the securities and/or increase the liquidity of the shares already traded on the stock market.

Since the roadshow depends on the size of the offering, the type of issuer, the profile of target investors, the pre-chosen market, and last but not the least the actual interest shown in initial meetings, it is not possible to determine either the length of this phase (generally it runs from a few days to a few weeks) or the cost. The roadshow is important for setting the share price for the IPO, because the intermediaries that follow the company can weigh their opinions against those of the people who will deem the initiative a success or a failure. In other words, intermediaries can come up with an offer price that is more in line with the expectations of the public, as observed during the various meetings (Jenkinson et al., 2006).

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Rogers International Commodities Index (RICI)

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The Rogers International Commodity Index (RICI) is a composite, U.S. dollar-based, total return commodity index, created by the investment legend Jim Rogers in 1998.

RICI represents the value of a basket of 36 different exchange-traded physical commodities consumed in the world economy, spanning from agriculture to energy to metal products, combined with the returns of the 3 month U.S. Treasury bill rate held as collateral. The selection and weighting of the portfolio is reviewed annually in December by the RICI Committee, which consists of the chairman Jim Rogers and one representative of each party: UBS, Daiwa Securities, Beeland Management, Diapason Commodities Management, and ABN Amro. Only the chairman can recommend new members for the committee. The selection criteria for futures contracts to be included in the RICI are an important role in global (developed and developing economies) consumption and public tradeability on an exchange to guarantee tracking and verification. In terms of ensuring liquidity, the most liquid futures contract internationally, in terms of volume and open interest, is chosen for computation of the RICI, if a commodity trades on several exchanges. To maintain stability and investability, the composition of the RICI is only altered under uncompromising circumstances, such as, nonstop unfavorable trading conditions for a single futures contract or critical changes in international consumption patterns. The Chicago Mercantile Exchange in collaboration with Merrill Lynch offer TRAKRS (total return asset contracts), which are exchange-traded, nontraditional futures contracts on the RICI.

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Roll-Up

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A roll-up is a consolidation strategy that aims to assemble a leading firm within a certain industry through an amalgamation of acquisitions and natural growth. A roll-up can be in combination with either an initial public offering of stock (sometimes called a "poof IPO") or a high-yield debt offering.

A more common strategy would be the strategic roll-up ("build-up" or "buy and build" strategy), which uses private equity and debt for the initial acquisitions. The strategic roll-up identifies a fragmented industry characterized by relatively small firms. Buyout firms (e.g., private equity companies), which have industry expertise, purchase a firm as a platform for further acquisitions (add-ons) in the same industry. The goal is to build firms with strong management, develop revenue growth while reducing costs, with the objectives of improved margins, increased cash flows, and increased valuations (Allen, 1996).

It is vital that the consolidation strategy takes place in industries where acquisitions could be strategically well integrated and where the synergies of consolidation comprise both revenue enhancements and cost savings. In addition, characteristics of these industries are high fragmentation (i.e., numerous small competitors), a considerable industry revenue base (i.e., multibillion), maturity of industry (moderate-to-slow growth in overall industry revenues), no dominant market leader, and

a small number, if any, of national players. Thus critical mass is attainable with a manageable number of acquisitions and numerous willing sellers with profitable operations. These features generate the opportunity for a well-financed, professionally managed group to rapidly achieve a national presence and a leading role in an industry through acquisitions.

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Round Turn

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The purchase (or sale) of a futures contract commits the buyer (seller) to accept (provide for) the delivery of a commodity or financial instrument in a specified amount of the commodity or financial instrument at a specified time, location, amount, and quality. If the buyer or seller of the futures contract does not want to take on the obligation of accepting or providing delivery of the underlying commodity or financial instrument, it is necessary to enter into an offsetting purchase or sale of the same futures contract. For example, if one purchased a contract for 1000 barrels of June 2008 crude oil, then one would need to sell a contract for 1000 barrels of June 2008 crude oil prior to the last trading day for this futures contract, as specified by the relevant futures exchange in order to not have to accept or receive delivery of 1000 barrels of crude oil. This purchase and corresponding sale of a futures contract is termed "round turn."

Rules (NFA)

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Futures markets in the United States are regulated federally by the Commodity Futures Trading Commission (CFTC). With the formation of the National Futures Association (NFA) in 1982, some responsibilities of the CFTC were shifted to the NFA in a spirit of self-regulation of the futures industry (Hull, 2003). NFA's regulatory activities consist in establishing and enforcing rules and standards for customer protection. Rules appear in the NFA Manual and are constantly updated.

NFA performs the following regulatory operations:

1. Establishing Financial Requirements. This activity consists in establishing, auditing, and enforcing minimum financial requirements for its futures commodity merchants and introducing brokers members.
2. Establishing Ethical Standards. Ethical standards include prevention against fraud, manipulative and misleading practices, as well as unfair and discriminatory transactions.

3. Membership Screening. A key initial measure in the regulation of members and associates is the selection of potential candidates for membership and registration as associates. The preliminary selection procedure is taken care by the NFA staff. Ultimate decisions on admission are decided by a group of NFA directors after a hearing is conducted.
4. Disciplinary Proceedings. NFA maintains a Compliance Department that is responsible for financial auditing and ethical observation. NFA also has the power to punish any associate or any of its members who are registered with the CFTC.
5. Arbitration Proceedings. NFA offers a fair, impartial, and a swift process for the resolution of client claims and complaints. The NFA's code of arbitration and member arbitration rules present a structure for these events and procedures.

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http://www.nfa.futures.org

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Sample Grade

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A sample grade is the quality of a commodity that is too low to be acceptable for delivery in satisfaction of futures contracts. The grade that is acceptable for delivery is called standard grade. First grade or high grade is the opposite of the sample grade. The different grades are defined due to the variations in the quality of commodities (CFTC, 2007a). Grain is especially affected by a broad range of these variations. To guarantee a specific quality, the United States Grain Standards Act defines inter alia the sampling, licensing of inspectors, and inspection requirements for commodities. The Secretary of Agriculture of the United States is authorized to issue regulations under the Act to ensure the efficient execution of the provisions. Included in the regulations are the Official Grain Standards of the United States. These standards have been developed for wheat, corn, barley, oats, rye, flaxseed, soybeans, etc. They include descriptions for different quality grades including sample grades. For instance, for corn, U.S. sample grade is corn that does not meet any requirements of the other quality grades, that includes a determined amount of contaminants such as glass, stones, or unknown foreign substances, that has a commercially objectionable foreign odor, or that is otherwise of distinctly low quality (CFTC, 2007b). If a commodity is U.S. sample grade, it is not allowed to be delivered. The grading of a certain commodity is accomplished by licensed inspectors. They are obliged to satisfy criteria set by the Secretary of Agriculture regarding requirements for taking a correct and representative sample and for determining the accurate grade of any commodity.

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Scalper

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In futures exchanges, a scalper is considered as a noninstitutional trader who makes a great number of purchases and sales each day. The scalper maintains the resulting positions for only brief intervals of time, and holds either zero or small net overnight positions. He/she purchases and sells quickly, making either little profit or loss. In general, the scalper is ready to purchase at a lower price than the last transacted price and to sell at a fraction higher, therefore generating market liquidity. Silber (1984) found that the average scalper holds positions open for approximately 2 min and trades an average of 2.9 contracts per trade. Working (1977) found that a typical scalper holds positions open from 1 to 9 min and trades only one to four contracts at a time.

Scalpers tend to specialize in market making. Collectively, they estimate the function of institutional market makers by making available the required liquidity services. They are seen as providers who match buyers and sellers requiring instantaneous execution of their trades. In fact, scalpers receive income from hedgers by momentarily taking up hedging orders that are not immediately assimilated. The price of immediacy is, thus, the mechanism by which scalpers derive their profit. Nevertheless, scalpers are under no obligation to continually bid or offer, or to make an orderly market.

Scalpers tend to specialize in scalping particular commodities rather than moving around the floor, and they do little brokering. In fact, they do little speculating outside their home market and infrequently execute trades for other participants in the market. To summarize, scalpers tend to trade for their own account in their home market in such a fashion as to generate income from the asynchronous order flow from customer accounts.

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Seasoned Equity Offering (SEO)

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A seasoned equity offering (SEO) is a new issue of an equity security that has previously been placed in the market through a prior issuance. Although an SEO is a primary market transaction, it is not the first time that the security will actually be held by the general investing public; it simply adds to the number of outstanding shares.

Firms, generally, have two options for facilitating an SEO: a cash offer or a rights offer. In a cash offering, the new shares are issued to the public for cash, which results in a reduction of the proportional ownership of existing shareholders (i.e., dilution). However,

with a rights offering, existing shareholders are awarded rights to purchase the new shares, many times at a reduced cost relative to the market value. Existing shareholders can choose to exercise the rights, thereby retaining their proportional ownership, or they can sell the rights in the open market.

Under either approach, issuing firms will typically employ an underwriter, who will serve a similar role as in an initial public offering (IPO)—overseeing legal, administrative, and marketing aspects of the issuance. Nonetheless, since the security is already traded, there is less pricing risk, which implies the compensation (gross spread) received by the underwriter is much smaller than for an IPO. Further, this reduced pricing risk also results in a much lower degree of underpricing (almost nonexistent) relative to a typical IPO.

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Second-Stage Funding

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Second stage-funding is a special type of financing round in venture capital finance and fits into the general concept of capital staging, that is, the portioning of capital contributions according to the achievement of milestones in the development of the financed firm. It belongs to the broader category of the so-called expansion phase financings, which include second-, third-, and later-stage financings such as mezzanine and bridge financings.

In contrast to early-stage financings such as seed, start-up, and first-stage financings, expansion phase financings relate typically to entrepreneurial firms that need additional capital in order to enlarge the product portfolio through additional R&D, to increase production capacities, to penetrate new markets, etc. Hence, the distinctive characteristic of second-stage financings is that firms already have at least one developed, that is a marketable product. Besides industry-specific aspects venture capital firms often specialize in financing entrepreneurial firms, that are in a distinctive financing stage. That is, because financing and advising firms in those different development stadiums also need particular competencies on the side of the venture capitalist. Important aspects to be mentioned with respect to second-stage funding are the reduction of adverse selection and moral hazard problems, the professionalization of strategic management, the improvement of (financial) monitoring, networking, and managerial recruitment, as well as forcing CEO turnover if necessary.

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Secondaries

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In venture capital and private equity, secondaries, also known as secondary market or private equity secondaries, is a term for the market in which preexisting (i.e., primary) commitments to private equity funds are traded. Original investors of a fund may sometimes seek liquidity of their investment before the scheduled date of distribution by the limited partnership. They can put their investments in the fund as well as any remaining unfunded commitments on sale on the secondary market. A secondary investment involves the purchase of either the portfolio of the direct investment or the limited partner's position in the fund and provides some liquidity for the original investors.

In the primary market, in contrast, a limited partner invests directly in the fund. Original investors might turn to the secondaries for various reasons: investment strategy changes, rebalancing the portfolio, inability to meet the subsequent takedown schedule, and so on. Thus, the main advantage that the secondary market offers is a shorter period of investment in the fund than that possible with the primaries.

While there is no public market for most private equity investments, a robust and maturing secondary market exists for sellers of private equity assets. Funds specialized in trading in the secondaries, called secondary funds, purchase existing investments.

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Secondary Action Track

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A secondary action track is a proprietary trading model of the IPO Financial Network Corporation (IPOfn) that gives short-term recommendations on secondaries. Only filtered companies are taken into account, which are those that have filed to issue additional stocks but have not yet been priced. By paying a subscription rate, the customer receives reports containing, for instance, buy and sell signals, triggered buy and sell signals, canceled buy and sell signals, and expected earnings announcement dates (see http://www.ipofinancial.com/faxpak.htm, retrieved July 18, 2007).

The trading model takes no fundamental information into consideration. Fundamental information would include, for instance, income statement data such as earnings, balance sheet data such as book value of assets and liabilities, and cash flow statement data such as cash flows from operating activities. The basic methodology used for the secondary action track is called technical analysis, in contrast to the fundamental analysis that applies fundamental information. Technical analysis studies past financial market data and identifies nonrandom price patterns to forecast price trends (Kirkpatrick and Dahlquist, 2006). Thus, the technically based program of the

IPOfn corporation only requires price activities of the considered stocks and attempts to identify short-term trends (see http://www.ipofinancial.com/institut.htm, retrieved July 18, 2007). IPO Financial Network also offers daily faxed reports for initial public offerings referred to as IPO action track.

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Secondary Buyout

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A secondary buyout is the sale of a portfolio company by a private equity investor (or syndicate of investors) to another private equity investor (or syndicate of investors). Secondary buyout is an exit alternative to trade sale or initial public offering. Secondary buyouts have become an increasingly important exit route since the late 1990s, and there are a rising number of tertiary or quaternary buyouts.

There may be several reasons for choosing this exit strategy (e.g., Clark and Kojima, 2003; Wright et al., 2006). First, the company is not yet mature for an IPO (or a trade sale), and cannot be financed by the present investor in the future because this investor is specialized only in certain financing stages (an early-stage fund, for example, seeks to sell a company that is just moving to the expansion stage) or because the fund is nearing the end of its contractual life. Second, in comparison to an IPO, when private equity investors retain a large fraction of their shares beyond the IPO as is usual, secondary buyout offers the advantage of the completeness of exit. Third, secondary buyouts can be executed faster than IPOs and trade sales. Lastly, in cold IPO markets and in times when corporations' acquisition appetite is low, a buyout gains importance as an exit strategy.

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Secondary Market

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The term "secondary market" is used to include organized exchanges, the over-the-counter market (OTC), the third, and the fourth markets. The existence of the secondary market is explained by the need for providing an efficient mechanism for the resale of securities that were previously purchased in the primary market. The trading of the securities is between the investors; consequently no funds are transferred to the issuing corporation. Volume of trading in the secondary markets is larger than that in the primary markets.

The organized exchanges are centralized institutions in which buyers and sellers competitively determine prices of the traded securities. They are characterized by the following:

a. Have known locations
b. Have permanent staff
c. Disseminate continuously and instantaneously all the required information on the listed companies, listed securities, and trading
d. Have regulatory bodies that legally impose several restrictions on all the aspects of trading securities in order to provide a fair trading ground for the participants
e. Provide a continuous mechanism to bring together traders of securities
f. Have minimum transactions costs

The OTC market handles all securities transactions that are not conducted in the organized exchanges. In other words, the securities of unlisted corporations are mostly traded in this market. It does not have any central location and consists of a network of dealers linked together by telecommunication devices. Once the security prices are determined by negotiations, the dealers in this market can directly deal with each other and with customers.

The third market serves the needs of large institutions that wish to avoid full brokerage costs by the exchanges on large transactions. The securities listed on the organized exchanges are traded between large institutional investors through brokers who reduce their fees because of the large volume of trading. The fourth market, however, is where the trading of securities takes place directly between the buyers and the sellers. This market is essentially a telecommunications network among large institutional investors who are primarily interested in trading large blocks of unlisted stocks.

The benefits of the secondary markets, mainly the organized exchanges, can be explained from (i) the investors' and (ii) the firms' point of view. From the investors' point of view, the benefits can be listed as follows (Civelek and Durukan, 2003):

a. They encourage investments in the primary markets. Investors are more willing to buy securities in the primary market when they have the opportunity to sell them in the secondary market.
b. They provide price stability for the securities.
c. They provide liquidity. They enable the investors to convert their securities into ready cash by making it easier to sell them at a ready market where the instruments are continuously traded. The price is set by an impersonal market on the basis of the rules of demand and supply, and finding a buyer is also not difficult.
d. They provide a continuous trading mechanism. The buyers and the sellers continuously trade in the secondary market.

From the firms' point of view, the benefits can be listed as follows:

a. The price of the security that the issuing firm sells in the primary market is influenced by the prices in the secondary market. That is, the investors who buy securities in the primary market will pay the issuing firm no more than the price that they think the secondary market will set for the security. The higher the security's price in the secondary market, the higher will be the price that the issuing firm will receive for a new security and hence

the greater the amount of capital it can raise. Conditions in the secondary market are therefore the most relevant to firms issuing new securities.

b. The availability of the secondary market enables firms to raise capital in the primary market to take advantage of timely investment opportunities (Bierman, 2003). A publicly traded firm in this respect has several distinct advantages over the private equity firm when raising capital. The firms' existing share price forms a base for both the firm and the investors when the new issues are traded. Without a market price, the definitions of terms and a formula for computing the price of a new issue become important. It is much more satisfying to sell at a market price than it is to set an arbitrary price without reference to a market price. Moreover, since a firm with publicly traded stock is required to file audited financial statements that give potential lenders more confidence about the reliability of the financial information, it is easier for these firms to issue debt securities.

The efficiency of the markets, mainly the secondary markets, is a major issue in the finance literature (Fama, 1998). The focus is on informational efficiency, that is, an efficient market is defined to be the one in which a set of information, which arrives randomly at the market, is fully and quickly reflected in the market prices of securities. For a market to be characterized as an efficient one, it must be characterized by

a. A large number of rational, profit seeking, risk-averse investors who compete without restriction with each other in valuing future benefits of individual stocks
b. A sufficient number of industrious, inquisitive, informed, and knowledgeable security analysts who strive to discover profitable investment opportunities by detecting inefficiencies in the market. Their primary function is to remove the inefficiencies and restore the equilibrium between price and value in the market
c. Rapid and full dissemination of all relevant information that might affect investors' expectations
d. Low transaction costs
e. Fairly continuous and wide trading

The literature distinguishes three levels of information through which the market efficiency is appraised. Within this formal framework, market efficiency can be presented in the following forms (Rose, 1997): (i) weak form efficiency if prices fully reflect all historical information about past market behavior; (ii) semistrong form efficiency if prices fully reflect past market behavior plus other types of publicly available information on the economy, industries, and the companies; and (iii) strong form efficiency if prices reflect all public and private information. It should be emphasized that the efficiency of the market is especially crucial for optimal allocation of scarce capital for economic development.

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Secondary Offering

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When major security holders in a company want to sell a large chunk of such securities on the stock market, they do so by going through the process of making the securities available to the public for purchase by all interested investors (Mikkelson and Partch, 1985). The process usually requires registering the offering with the regulatory authorities as well as a stock exchange. A secondary offering is therefore the offer for sale of securities already issued to the wider investing public. It differs from the situation where a listed company creates and sells new securities to either investors, current shareholders, or new and current shareholders—a seasoned equity offering. It encompasses situations where a large block of shares, for instance, is turned over to the investor's broker to sell on the stock market over a number of days—a block trade. Such block trades may occur even without the knowledge of the company and does not involve any notification of the regulatory authorities. It also includes pre-IPO shareholders selling some of their shares (secondary shares) in an initial public offering. An initial public offering that consists solely in the sale of shares by pre-IPO shareholders is also a secondary offering.

In a secondary offering, the money raised goes to the selling security holders and not the company. The selling shareholders therefore bear the costs of such offerings—price declines on announcement and underwriting fees. Secondary offerings reduce the ownership stake of those who sell—such as founders—but do not dilute their holdings.

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Sector Breakdown

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A sector breakdown provides information about the exposure of a portfolio to the sectors in the economy. HFRI, a Chicago-based index provider, tracks the following sector categories: energy, financial, health care/biotechnology, real estate, technology, and miscellaneous. The indices are equally weighted performance indexes, employed by many hedge fund managers as a benchmark for the funds they manage. Funds are assigned in categories based on the descriptions in their offering memoranda. Another way to determine the sector breakdown of a portfolio of funds is to use returns-based style analysis in which the fund's historical returns are regressed against the returns of a set of passive benchmarks, in this case sector benchmarks, to determine the exposures of the fund to different sectors of the economy.

Sector specialists usually hold long and short positions in stocks of companies with similar products or markets as that of the long positions. Alternatively, sector specialists may short a sector index. Net exposure of sector portfolios may range from net long to net short across managers and across time. In a rising environment for a particular sector, managers may increase their net long position hoping that their

long positions will appreciate more than the broad sector, and their short positions will appreciate less. Conversely, in a falling market, managers hope their shorts will fall faster than the broad sector.

A sector portfolio usually consists of "core positions" and "trading and hedging positions" (Nicolas, 2005). The core positions are usually held for a long period whereas trading and hedging positions account for most of the portfolio turnover. By taking positions in specific sectors, an investor is betting that these sectors will outperform the general market. Sector funds can be attractive as they allow investors to participate in companies they perceive to be in a faster-growing segment of the economy. Even mediocre companies can produce high returns in periods of broad sector outperformance. The availability of sector strategies allows the investor to do his/her own diversification and choose managers with desired risk-reward characteristics. The limited focus of sector specialists is another advantage because specialists get to know their universe of stocks very well and can unlock some of the highest value in that sector. On the downside, sector funds can be volatile because companies within them can be highly correlated. The strategy's profitability often depends on business cycles.

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Sector Strategy

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Sector strategy is a strategy that approaches the portfolio selection process by identifying the most profitable sector opportunities and then selecting the hedge fund managers or the securities composing the portfolio. It is a top-down approach to portfolio selection and it contrasts with the bottom-up approach of fundamental analysis and selection of hedge fund managers.

The objective of such strategy is to select the best performing sectors assuring the desired level of diversification. It allows the analysis of cross-strategies funds and across different asset classes. The strategy includes the use of macroeconomic data, factor models, and sector-specific models. Usual market data used in the top-down research and analysis includes sector stock indices, growth rate of the economy, credit spreads, interest rate volatilities, and changes in the yield curve. The critical factor for the success of this strategy is to choose the correct sectors as well as to avoid lagging sectors.

An equity manager would trade cyclical stocks following the dynamics of the business cycles. A bond portfolio manager would design the strategy on the basis of predicted changes in the shape or level of the yield curve. It includes varying the weights of the bonds in the portfolio assigned to the different sectors of the issuing companies. An instrument that is frequently associated with sector strategies is exchange-traded funds (ETFs). ETFs are index tracking exchange-traded products and many of them track

sector indices. Because they can be traded as a stock, admitting short sales, sector ETFs are often included in long/short portfolios that aim to replicate hedge fund returns distribution.

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Security Future

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"Security future" is a term used to collectively describe futures on individual stocks, known as single stock futures, and futures on narrow-based indices. Authorized in December 2000 by the Commodity Futures Modernization Act, a single stock futures contract represents 100 shares of the underlying stock that will be delivered on a specific date. These may be traded in a securities or futures account and on margin.

Typically, 20% of the contract value is required for minimum and maintenance margin. However, this varies if the investor has other collateral such as cash, stock, or futures contracts. Money managers and other investors can take advantage of leverage with single stock futures contracts. For example, if a share of stock is worth \$50, then one single stock futures contract is worth \$5000. The investor would need to have \$1000 (\$50 × 100 shares × 20%) in his account. If the stock goes up by \$10, the contract is worth \$6000, and the return on the original \$1000 investment is 100% (\$6000–\$5000/\$1000). By contrast, if you purchased 100 shares of the \$50 stock (\$5000) and it goes up by \$10, your return is 20% (\$1000/\$5000). Leverage works both ways. Losses are also magnified when underlying stocks go down in value. Another advantage of single stock futures is no "uptick" rule when selling these contracts short.

Selling is as easy as buying, without the burden of borrowing shares. Investors use single stock futures to hedge individual stock positions, to spread trade between same stock sectors, to spread trade with equal-sized contracts, and to neutralize specific stocks or sectors from a specific fund position.

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Seed Capital

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Seed capital, also known as seed money, refers to the capital invested in a start-up company during its first round of financing (i.e., seed stage financing). It can come from the savings of the company founders themselves, borrowings from "angel investors" who are often family, friends, and personal connections of the founders, or investments from

venture capitalists interested in early-stage companies.

Seed capital is usually raised in the form of loans or investments in exchange for ownership equity. During the seed stage, the founding entrepreneurs have just been incorporated in the company and are in the process of developing the product or service. They test out an invention or a new idea and are yet to produce for sale.

The management team uses seed capital to support the initial operations and early-stage growth of the company, covering preliminary expenses in market research, product development, business planning, and beta testing. It may be a very modest amount since the venture is still in or just growing out of its conceptual stage, for example, starting a new business with $10,000 or less is not unusual. It also has a higher risk of failing compared to the investments of later-stage companies. Seed capital is distinct from venture capital. The latter usually comes in a much larger amount accompanied by more complicated contracts, varying extents of management control by the investors and corporate structure.

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Seed Money

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Seed money refers to the very initial round of funding for a start-up to get off the round. Typically, the fund is provided by the founder-entrepreneurs, their families and friends, although it may also come from angel investors. The amount of seed money raised is usually small ($10,000–$20,000, although it may be as large as $100,000) and is just enough to pay for the initial operations of the business, such as research and development, producing the prototype, as well as putting together a business plan. When the operations are established, the founders would then approach venture capital firms for further rounds of funding. The sourcing for seed money is usually quite straightforward, compared with the lengthy due diligence required by venture capital firms before they decide to invest in a start-up.

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Seed Stage Financing

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Small amount of capital provided to an inventor or entrepreneur at the seed stage of a company to allow them to move closer to a

start-up. The seed stage follows the preseed stage and is followed by the first (or early), second, third (or mezzanine), and bridge (or later or expansion) stages in the life of a company. Seed stage financing typically goes toward the development of a product, initial market research, business plan preparation, and management team building. At this stage, the product has not yet been sold commercially. An initial investment in a seed company ranges between $50,000 and $500,000. Angel investors have been the largest source of capital at this stage, followed by the venture capitalists; the number of angel investments at this stage is 50 times as big as those made by professional venture capitalists. At the seed stage the risk of losing the investment is quite high, only 20% make it to the second round of financing. Consequently, the angels demand a large share in the seed company. Recently, there has been an increase in the number of angel groups, that is, a few angel investors (generally, two to five angels) pulling together to invest in seed companies. The advantage of angel groups is that they pull together capital, expertise, and business contacts. The downside, however, is that angel groups can impose more restrictive terms on the newly founded company.

Segregated Account

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By definition it is an investment fund that can have several legal structures with the goal of grouping assets and investors' money together following the strategy defined in the legal documents. The main advantages of investing in a fund are professional management, diversification (since the asset based is larger), and economies of scale. The main disadvantages are (1) the level of information given by the managers tends to be limited and (2) the liquidity terms of the funds are not always in line with the one required by the investors. This can come from several sources: either large investors may have the power to ask for more attractive liquidity terms, or investors do not require the assets invested for longer periods of time but they want to negotiate lower fee structures.

Another element that may intervene is that the strategy may not perfectly fit with the one the investor is looking at and in some cases the manager can easily adapt the strategy by reducing the size of the positions, hedging some part of the market risk, or increasing leverage. Finally, some investors require receiving a copy of the portfolio even if the strategy is relatively illiquid and the manager prefers not to diffuse it. All these adaptations can easily be done through a segregated account (also known as a separated account).

In a managed account, the managers create a separate account with the assets of the corresponding client. The underlying strategy remains usually close to the one of the corresponding fund (in some cases it can be a clone), but the liquidity terms, fee structure, and transparency are generally different. Large institutions tend to use segregated account when they invest a significant amount with managers. Minimum sizes for segregated accounts are from $5 million up to $50 million, with an average being approximately $20–$25 million.

Segregated accounts can be prepared for almost any strategy but they are often created in the case of quantitative strategies

that are easily adapted to particular investor needs. Segregated accounts are also used by hedge fund platforms. These platforms were developed less than 10 years ago by hedge fund selectors covering all the hedge fund strategies (see Lyxor). These companies analyze the hedge fund universe and negotiate capacity with the funds they prefer while recommending to their clients to invest in the managed accounts the firm has negotiated.

As stated by Lake (2003) the advantages of such platforms are that (1) investors may have access to managers that do not accept "new" investors, (2) the platform may offer more attractive liquidity terms than the fund managed by the same team, and (3) the selector may have higher transparency, enabling him to provide full risk management reports to the underlying investors. These platforms are also usually tax efficient and enable asset allocation changes. Their main drawback is the added level of fees and investors do not have access to the final underlying portfolio.

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See http://www.lyxor.com for a real example of a hedge fund platform.

Selection Bias

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Selection bias refers to the distortion of hedge fund index time series data because of possible selection criteria from database providers. The distortion can occur because not all hedge funds are considered while calculating index values. Index sponsors make their database choices in the following ways: (1) Hedge funds that fulfill the selection criteria are chosen because of their outstanding performance and hence their search for new investors and (2) there is a relatively large number of hedge funds that have ceased to accept investment funds, and therefore refrain from reporting performance to any database. Hence, it is possible that the performance of hedge fund indices is too low because of selection bias.

However, the empirical verification of net selection bias can be problematic. Fung and Hsieh (2002) note that selection bias may be indicated by the number and identity of hedge funds in various databases. Liang (2000) quantifies the overlapping of TASS and HFR databases, concerning existing funds with 41% and liquidated funds with 32%. Lhabitant (2006) investigates four of the largest hedge fund databases (HFR, CS/TASS, CISDM, and MSCI) and finds that only 3% of individual hedge funds report to all four databases and only 10% report to three. This may mean that a large number of single hedge funds can only be found in one or two databases. Owing to differing construction methods, selection criteria, and data basis, the world of hedge fund indices is actually extremely heterogeneous. Heidorn et al. (2006) investigate the time series of six different index providers for the period January 1998–April 2005. They observe differences among the individual index families of up to 18.06% in yearly performance, 12.04% in volatility, and 8.5% in correlation between indices.

Regarding the selection criteria of hedge fund indices, Heidorn et al. (2006) note that 47.6% of all providers demand an average

minimum fund volume of U.S. $26 million from single funds. Additionally, about 80% of the providers who demand minimum fund volume also expect a respective minimum track record from single funds. Among the index providers, 38.1% require a minimum track record of 1.3 years. Only three providers who demand minimum requirements for volume and track record also include in their index, calculation funds that have reached capacity and have closed to new money. Out of all benchmarks, 61.9% included closed funds for index calculation. However, the share of closed funds is relatively small, at about 10%. Several different approaches exist to relate single funds to the respective strategy indices. In half the indices, the individual single funds determine the index, and thus the strategy under which they are classified. The amount of selection criteria demanded from the databases is negatively correlated with the purity of hedge fund indices. Hence, a huge selection criteria catalog is counterproductive for the representativity of hedge fund indices.

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Self-Regulatory Organization

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Self-regulation is a mechanism of quality vigilance that is commonly applied in financial markets. The players in these markets generally form a self-regulated organization (SRO) composed of some members. An SRO has statutory responsibility to regulate its own members through the approval and enforcement of set of rules of conduct for impartial, ethical, and efficient practices.

The regulatory authority could be employed (i) in addition to some form of public regulation, or (ii) to fill the emptiness of a lack of government supervision and control.

In the securities industry, there are many SROs such as National Stock and Commodity Exchanges (e.g., the NYSE) and the National Association of Securities Dealers (NASD).

The SRO's purpose is to maximize the welfare of its members. On one hand, to be successful, an SRO should (i) be independent, both in perception and reality, from the entities it purports to regulate; (ii) develop standards that are meaningful and broadly accepted; (iii) be recognized as legitimate and relevant by the market agents; (iv) provide for fair and respected enforcement.

On the other hand, investors expect that an SRO should (a) effectively watch its members, controlling their quality provision; (b) punish and publicly denounce any evidence of bad quality provision or

fraud, as a credible signal of its level of surveillance and the quality the consumers may expect in the market. However, self-regulation implies a situation of regulatory capture, hence the incentives for the SRO to do its job are not guaranteed (Javier Nuñez and Lima, 2004).

In theory, a self-regulatory strategy would exploit many of the rewards of an established market while bypassing many of its weaknesses. In effect, a part of the governance of the financial firm is outsourced to a central SRO, while the firm's output for financial services is still determined based on free market outcomes. This central organization is an effective solution to the free rider problem of industry reputability and, according to Verrett (2007), could help foster a healthy Nash Equilibrium to deter fraud in the hedge fund management industry.

After the Sarbanes-Oxley Act was promulgated, many criticisms have been addressed to self-regulation. In fact, according to the SEC's chairman, "self regulation has played a key role in protecting investors for a very long time. Most observers agree that the SRO system has functioned effectively, and has served the government, the securities industry, and investors well. But despite this general agreement, one feature of the system in particular has increasingly drawn the attention of reformers—and that is its reliance on multiple, redundant regulators" (Cox, 2006).

Like public regulators, even self-regulators are experiencing a process that should make the system more safe and sound through a merging route, in order to overcome the causes of turmoil of many SROs (many rulebooks, separate regulatory staffs, and completely different enforcement systems).

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Self-Selection Bias

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The term self-selection describes the situations in which people select themselves into a group. In such situations the people's characteristics force them to behave in a certain manner. An example would be a contractual guarantee, which forces vendors of inferior products to leave the market because the guarantee is too costly for them. However, the vendors with good-quality products remain in the market because they can afford to offer the guarantee. The self-selection bias is the systematic distortion resulting from the fact that the remaining sample of vendors does not correspond to the general population of vendors.

In the hedge fund industry, self-selection exists because of the voluntary basis of data reporting. Unlike mutual funds, the managers of hedge funds are not required to disclose performance numbers or any other information to anyone else than their current investors. Hence, only some hedge fund managers report information

to the data providers. Small funds with a good track record have an especially strong incentive to report performance numbers in order to attract new investors. However, if the fund is sufficiently large or the track record is bad, the hedge fund manager may decide not to report information to the data providers.

As only the most successful funds have an incentive to report past performance, the sample of hedge funds reporting information to a data provider does not necessarily represent the general hedge fund population. Hence, the mean return of the hedge fund in the database might be higher than the mean return of all hedge funds.

Seller's Market

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A seller's market is a market favorable to sellers, arising when the growth of demand outstrips the growth of supply. This relative scarcity of the commodity for sale results in rising prices or improved conditions for the seller.

When a market is in equilibrium, the number of sellers at a given price, by definition, equals the number of buyers. However, if the number of willing buyers is growing at the current prevailing price, while the number of sellers is falling, constant, or growing at a slower rate, the equilibrium price rises and the market is labeled a "seller's market." Characteristics of a seller's market, in addition to the tendency for higher prices, include a reduced time on market before the asset or commodity is sold, increased demand for speculative purposes in anticipation of higher prices later, and an increase in the listing price of the assets in anticipation of higher future prices. This phenomenon of contracted supply and increased speculative demand further exacerbates the seller's market to the point where an artificial speculative bubble can occur.

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Selling Group

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Selling group is a group of investment banking firms or broker-dealers assembled by an underwriting syndicate to help facilitate an initial, secondary, or international securities offering.

A company raises capital in the public market by commencing a securities offering. Securities offerings are administered by an underwriting syndicate composed of a managing group, an underwriting group, and a selling group. The managing group assists in preparing and filing the prospectus, performs due diligence, and structures the underwriting syndicate for the offering. The underwriting group builds an order book and commits financially to acquire unpurchased shares through the

offering. The selling group, created by the managing group, functions as a broker by marketing the securities to its customers, and communicating the clients' requests for shares to the underwriting group.

Each member of the selling group is required to sign a selling group agreement that outlines the selling group's compensation and responsibilities during the securities offering. Compensation for the selling group's efforts is called the selling concession, and is shown as a discount to the public offering price.

Frequently, the selling group members will be the identical firms in the managing and underwriting group. Alternatively, in larger deals, the managing group may invite other firms to participate in the selling group, which are not part of the managing or underwriting group.

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Selling Concession

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Selling concession is a discount to the public offering price given to a selling group to facilitate an initial, secondary, or international securities offering. Securities offerings are administered by an underwriting syndicate composed of a managing group, an underwriting group, and a selling group. The managing group assists in preparing and filing the prospectus, performs due diligence, and structures the underwriting syndicate for the offering. The underwriting group builds an order book and commits financially to acquire unpurchased shares through the offering. The selling group, created by the managing group, functions as a broker by marketing the securities to its customers, and communicating the clients' requests for shares to the underwriting group.

Compensation for the underwriting syndicate is the spread between the public offering price and the price paid to the issuer by the underwriting syndicate. The spread is typically divided among the underwriting syndicates using the following percentages: 20% to the managing group, 20% to the underwriting group, and 60% to the selling group. The selling group's percentage of the spread is greater than 50% due to the time consuming sales efforts required by the selling group to place the securities. The selling group's percentage of the spread is called the selling concession, and is shown as a discount to the public offering price. The discount is usually 2–3% of the public offering price. Selling concessions can be reclaimed from the selling group by the managing group if the securities originally placed by the selling group are purchased during a syndicate covering transaction. This arrangement is called a penalty bid.

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Selling Shareholder

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A selling shareholder is an existing security owner of a company that sells all or a portion of the shares they own as part of a company's initial, secondary or international securities offering.

Securities offerings can only be made by means of a prospectus that details pertinent disclosures, company financial information, and relevant offering information. Once the prospectus has been filed with and declared effective by the Securities and Exchange Commission (SEC), underwriters may begin distributing the prospectuses to generate interest in the issue. Securities for sale in the offering may include shares owned by company and selling shareholders. If an offering includes shares owned by selling shareholders, then the prospectus will detail the identity of the selling shareholders, the number of shares being sold by selling shareholders, and whether selling shareholders will be offering their shares pursuant to the securities offering or the underwriters' overallotment.

The costs associated with the registration and sale of the securities may be paid for by the issuing company. However, the selling shareholders are responsible for any brokerage commissions. In addition, selling shareholders may be required to retain a broker-dealer who is registered in the state that the selling shareholder is trying to sell their shares in.

All net proceeds from the sale of the selling shareholders' securities go directly to the selling shareholders. The issuing company does not receive any proceeds from the selling shareholders stake.

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Semideviation

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Semideviation (or downside risk) measures risk below a certain level of the time series, capturing the downside risk exclusively. The value used to admit observations is identified as the minimum acceptable return (MAR). This measure of risk helps in determining different notions of volatility with respect to return targets (frequently zero for retail investors or a benchmark for institutional intermediaries).

According to Roy (1952), investors are more concerned about downside losses than upside gains. In his book on portfolio selection (1959), Markowitz advocates using semivariance as a measure of risk because it measures downside losses rather than upside gains. More recently, the behavioral framework of Kahneman and Tversky (1979) places more weight on losses relative to gains in their utility functions.

Downside risk or semideviation is a special case of the lower partial moments (LPM). For discrete data, LPM of order m can be defined as follows:

$$\mathrm{LPM}_m = \frac{1}{n} \cdot \sum_t \left[d_t \cdot (r_t - L)^m \right]$$

where n is the number of returns; d_t is the indicator function: $d(t) = 0$ if $r_t > L$, $d_t = 1$ if $r_t <= 1$; L is some threshold; r_t are portfolio returns; m is a coefficient determining the shape of the penalty function.

LPM is a very general type of risk measure mainly used in academic research. A lot of other risk and return measures can be expressed as "special cases." One of the better known LPM measures is semideviation (SD) or downside risk, defined as an LPM with $m = 2$ and $L = \mathrm{MAR}$:

$$\mathrm{SD} = \sqrt{\frac{1}{n} \cdot \sum_t \left[d_t \cdot (r_t - \mathrm{MAR})^2 \right]}$$

where MAR is the minimal acceptable return; d_t is the indicator function: $d(t) = 0$ if $r(t) \geq \mathrm{MAR}$, $d(t) = 1$ if $r(t) < \mathrm{MAR}$; n is the number of returns of the time series; r_t are the portfolio returns.

Semideviation is typically used in the context of the risk-adjusted performance indicators, in particular, the Sortino ratio.

Ang et al. (2006) show that the cross section of stock returns reflects a premium for downside risk. Stocks that covary with the market, conditional on market declines, have high average returns. This risk-return relation is coherent with an economy where agents place more weight on downside risk than on upside movements. Players with aversion to downside risk require a premium to hold assets that have high elasticity to market recessions.

This empirical evidence has an interesting implication for hedge funds. Generally, if returns have negative skewness, the semideviation will be greater than the standard deviation, as can be seen with the convertible arbitrage, distressed and value, event-driven, and fixed-income arbitrage strategies. When selecting funds within a strategy or when building an asset of different strategies, using semideviation instead of standard deviation may result in a bias that exhibits less negative or more positive skewness, resulting in a better investment understanding.

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Settlement Date

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At expiration, a forward or futures contract calls for either delivery of the item or a cash payment of the same value. Future products expire on day T. The settlement date for delivery for most exchanges is specified as T plus x, where x is the number of days after the expiration of the future contract. For example, security future products of the Options Clearing Corporation expire on the third

Friday of every month and have the settlement date for delivery of *T* plus three.

In the case of swaps, the term settlement date is used to specify the date on which a payment occurs while the period between settlement dates is called the settlement period. Take a plain vanilla interest rate swap with swap payments for one on the 15th day of every quarter beginning in March. The settlement dates for this contract is March 15, June 15, September 15, and December 15.

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Settlement Price

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The settlement price is the average price at which contracts are negotiated, calculated both at the opening and, especially, at the closure of each day of trading (Hull, 1997). It is the price that is used to mark to market the positions of the participants in a particular market. To mark to market consists of valuing a position at the settlement price, which is normally different from that which it had at the moment of purchase or sale of the asset. In the options and futures markets this operation is carried out daily to adjust all the positions, with the objective of reflecting the closing price established by the day's prices. This settlement price is necessary to determine whether profits or losses have been produced in the contracts during a certain period of time as well as to determine the needs with respect to the margin. In this sense, the margin is the deposit that the operator of the futures and options market must make to cover the risk of nonfulfillment of a contract (Kline, 2000). The amount of this deposit varies from day to day, with the variation of the operator's position. The determination of the latter is when the settlement price intervenes, given that the variations in the value of each position are added to or subtracted from the margin at the end of each day, when all the current positions of each operator are marked to market.

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Shelf Filing

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A process in which a company needs only to file paperwork with the Securities and Exchange Commission (SEC) once to reserve the right to issue securities, stocks, or bonds to the general public for up to 2 years. Given that the registration is a

time-consuming and expensive process, an issuer can register now and decide later when they wish to issue securities to the public. Further, if the issuer has an unexpected need for cash (bridge financing) they can quickly issue securities that have already been registered with the SEC, without going through the registration process again. This also helps a firm to avoid borrowing from commercial banks or other such entities, which is generally a more expensive proposition.

For example, assume a company has 500,000 shares of common stock that they wish to issue to the public at some time in the next 2 years. However, at the moment they only wish to issue 200,000 shares, holding the remaining 300,000 shares in reserve. The company would be wise to shelf register/file all 500,000 shares now, rather than registering 200,000 shares now and having to go through the entire process again within a year or two. To be eligible for a shelf registration, all 500,000 shares must be of the same type or class, carry the same risk, provide shareholders with the same rights, etc.

This process of shelf filing/registration is allowed via SEC rule 415 and generally requires securities to be investment grade securities or be similar to securities that have already been issued by the same company, who has filed with the SEC in the past.

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Short Exposure

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As stated by Anson (2006), the term hedge fund comes from the term "hedge." To hedge implies making an investment to decrease the risk of adverse price movements in an asset. Usually, a hedge consists of taking an offsetting position in a related security. One of the fundamental differences between hedge funds and mutual funds is that hedge funds combine long and short positions in their portfolio while mutual funds have very limited capacity to do so and take only long positions. Managers take long positions in a security when they buy this security. They make money if the corresponding security price increases and lose money if the price falls. In a short position managers make money if the price of the corresponding security falls and lose money if the price of the corresponding security increases. In other words, a short sale is the sale of security not owned.

The idea behind shorting is a simple mechanism: (1) a manager first borrows the security through a broker and sells it while the proceeds of the sale go in a margin account; (2) when the manager wants to unfold the position, he/she purchases the stock back on the market and returns it to the party from which it was borrowed covering the short position. Some countries impose rules prohibiting or limiting short sales to fight downward speculation. The process of short selling is illustrated in Figure 1.

The short exposure is measured as the sum of the short positions taken by a manager. The short exposure is subtracted

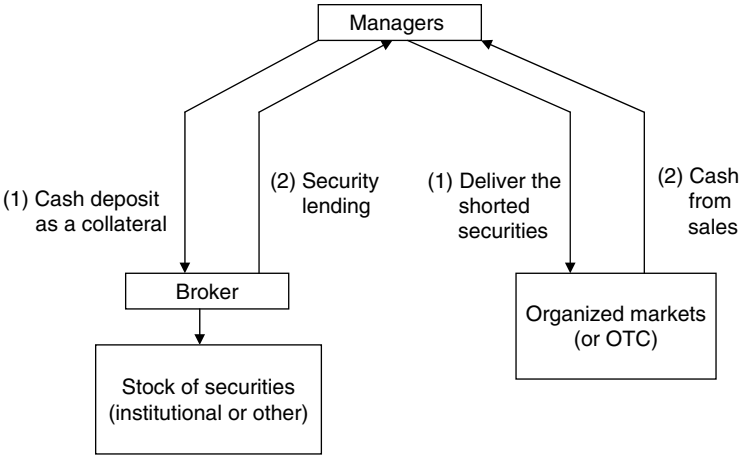

FIGURE 1
The process of short selling.

(respectively added) from the long exposure to estimate the net (respectively gross) exposure (see Taulli, 2004).

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Short Position

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A short position is created by selling a borrowed security, currency, or commodity with the expectation that the price will fall and the position can be purchased back at a lower price. To sell a security short, an investor, known in this case as a short-seller, borrows the security from a broker and sells it in the open market. In exchange, the short-seller has to post collateral assets in a margin account and return the borrowed stock at a future date by buying the stock back in the open market.

The short-seller pays the broker a fee for borrowing the stock but may earn a rebate on the proceeds from the short sale. The broker usually borrows the shares from another investor, who is holding his shares long. For example, active long investors lend out their securities in order to earn part of a short rebate, the interest on the proceeds from a short sale. The short-seller is also expected to pay to the lender any dividends that the stock pays. The short-seller hopes that the short position will fall in value, enough to more than offset any cost associated with borrowing the stock.

A short position may be taken in order to hedge, express a relative-value view between two securities or markets, or express an outright negative view on a security. An investor uses a hedging short position to eliminate an undesired risk. For example, a U.S. investor who likes a foreign stock but does not like the foreign currency may buy the stock and sell short the currency, agreeing to deliver the currency at a future date in exchange for dollars, and thus neutralizing his currency exposure. Further, when

added to a portfolio, short positions reduce systematic risk, as measured by beta, and reduce dependency on cyclical economic factors. For example, equity hedge managers may combine their long holdings with short sales of stock or stock index options to hedge against equity market decline.

An investor uses a relative-value position to capture relative mispricings between two securities by going long a security, which he believes is relatively underpriced and shorting a security with some relationship to the first security, which he believes is overpriced. Relative-value investing is the basis of market-neutral hedge fund investing.

Finally, an outright short position is a method for expressing negative view on a substantially overpriced security. A short position can be expressed not only through cash securities but also with futures and options. A short position in a futures contract requires the investor to deliver, or sell, a security, at some future date. A short position in a security can also be expressed through options — by selling short a call option or buying a put option. In the case of a short call option, the seller may be required to sell a security at a prespecified price in the future, and in the case of a put option, the buyer has the option to sell a security in the future.

In addition to risks experienced by long investors, short-sellers are exposed to unique risks such as share availability, "short squeezes," "execution risks," risk of unlimited loss, "taxation," and "legal risks" (Reynolds, 2005). The number of shares available to borrow for short selling may be very limited, as is often the case with small cap stocks. When there is a sudden large increase in demand for a stock, short-sellers may be subject to a short squeeze, where they are forced to buy back, or cover, stocks called in by the lenders. When they have to buy back the stock in times of rising prices, short-sellers may suffer significant losses.

Execution risk arises from the "tick" rule, also known as the "uptick" rule, adopted by the Securities and Exchange Commission (SEC) in 1938, which allows a stock to be sold short only after the price has moved up. This is done to prevent excessive shorting. While there is a campaign to abolish this rule, it currently presents a risk to shortsellers. Further, short-sellers may experience unlimited losses as prices go higher while their upside is limited. In addition, short sales are taxed at the higher short-term rates and short-sellers are exposed to lawsuits by the companies whose stock they are shorting.

Short-selling improves market efficiency by allowing investors to express negative opinions on securities that are overvalued and to balance a rising market. Short-sellers are usually shorter when the marker goes up, and less short when it falls, acting as a preventive force to market bubbles.

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Short Selling Strategy

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Short selling is an operation consisting of selling a borrowed financial instrument

with the intention to buy it back later. In doing so, an investor expects a fall of the price of a financial instrument. The short selling strategy is very popular in the hedge fund industry. Short sellers have a negative exposition to the market in the sense that their beta is negative and could be greater than 1 in absolute value. Because of this exposure, the return of those hedge funds tends to be lower than the ones of other hedge fund strategies.

During the period 1994–2005 (Lhabitant, 2006), an amount of $100 invested in an average short seller hedge fund at the beginning of 1994 would have been slightly under $100 at the end of 2005 while the same amount invested in the S&P 500 index would have returned about $250 in 2005. This proves that short sellers underperform over the long-term and seems to be a chronic problem for this strategy. Their returns are also much more volatile and a source of additional risk than those of the average hedge fund strategy given by a weighted composite index.

The performance of short sellers was effectively disappointing over the period 1994–2005 (Lhabitant, 2006). Hence, what are the benefits of short selling? According to Lhabitant (2006, p. 139), there are four benefits of short selling: (i) short selling contributes to market efficiency by conveying negative information to the market; (ii) it is the first line of defense against financial fraud or unjustified bubbles; (iii) short selling facilitates dealer liquidity provision; and (iv) short selling facilitates the implementation of several arbitrage strategies. We must not also forget that short selling is an essential part of hedging activities.

According to our studies (Racicot and Théoret, 2007), even if the mean return of short sellers is low, their Jensen's alpha may yet be high when accounting for the risk factors proposed by Fama and French (1992) and correcting for the eventual specification errors, which may contaminate the Fama and French model. Besides, short selling is generally viewed as a very risky strategy because the investors are used to buy and not to short sell. Short selling may also be accompanied by leverage operations, which might greatly increase the risk of the investments lying on expectations of falling prices.

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Short Squeeze

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A short squeeze denotes a situation where the demand exceeds the supply of a security by far as the result of short sellers trying to cover their short positions. A short sale is the sale of a security that the seller does not own. In order to deliver the security to the purchaser, the short seller borrows the security and then closes out its positions by returning it to the lender. Short selling can also be realized synthetically by writing a call and simultaneously buying a put, which allows bypassing the difficulties of

borrowing securities, but this approach is deemed to be both expensive and risky.

The short seller hopes to sell high and rebuy lower, which will be the case if the price declines. If the stock price starts to rise rapidly, short sellers, whose positions are loosing, may be forced to liquidate and cover their positions by buying the stock. This additional buying pressure on prices leads to a further rise in the price and potentially to the need of additional short covering.

The short squeeze illustrates the dangers associated with a short position, which can generate unlimited losses while in a long position the losses are limited to the current price of the asset (at worse, the price will end at zero). In general, the short squeeze is more frequent than the opposite situation, the long squeeze, where buyers have to sell out rapidly their long positions.

Short squeezes are favoured by automatic systems that trigger stop-loss orders. Small caps securities are known to be particularly exposed to the short squeeze risks. The inability of short sellers to maintain their positions due to the risk of short squeeze appears as a significant limit to arbitrage overvalued stocks (Gambao-Cavazos and Savor, 2007).

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Short the Basis

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A person or firm is said to be short the basis if he sells the commodity in the cash market and places a long hedge position by buying in the futures market. This is common in the commodity market, in particular for precious metals. The commodity holder protects himself against a price increase in the cash market by purchasing futures contracts on the commodity owned (Teweles et al., 1987). If the commodity price in the futures market moves up or down by the same amount as that of the cash commodity, the cost of hedging is the dealer's commission. The hedger profits when the basis is negative (weakening). If the cash price falls by a greater amount than futures, the hedger makes a profit (see Table 1).

TABLE 1

Hedgers Making Profits or Losses

Price Movement		To One Who is in the "Short" in the Cash Market	
Cash Price	**Futures Price**	**Unhedged**	**Hedged**
Falls	Falls by the same amount as cash	Loss	Neither profit nor loss
Falls	Falls by a greater amount than cash	Loss	Loss
Falls	Falls by a smaller amount than cash	Loss	Profit, but smaller than an unhedged loss
Falls	Rises	Loss	Profit, but greater than an unhedged loss
Rises	Rises by the same amount as cash	Profit	Neither profit nor loss
Rises	Rises by a greater amount than cash	Profit	Profit
Rises	Rises by a smaller amount than cash	Profit	Loss, but smaller than an unhedged loss
Rises	Falls	Profit	Loss, but greater than an unhedged loss

Source: Yamey, S. B. (1951).

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Single-Strategy Fund

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Hedge funds investment policies can be defined to be either single-strategy or multiple-strategy. Single-strategy funds are funds that pursue a specific strategy, whereas multistrategy funds are allowed to follow a variety of strategies and allocate capital between strategies without restraints.

Investment philosophies for single-strategy funds can be built on a particular trading strategy (either trend follower or discretionary) or, in a more traditional sense, focusing on the underlyings (sector- or region-based) (Davies et al., 2003, 2006). Based on the investment objectives, each single strategy fund is asked to classify itself by the database vendor using a broad investment strategy such as long/short equity, relative value, fixed income, macro, event-driven, and so on. These classification sets are rather heterogeneous as every fund manager follows proprietary strategies within the broadly defined investment objectives. For a more detailed description of investment strategy classification and possible investment strategies, reference is made to the encyclopedia entry "Alternative investment strategies." Note that as single-strategy funds focus on a particular market segment and/or strategy, they usually suffer from a lack of diversification and, thus, higher risk when compared to other, for example, multistrategy instruments.

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Single-Strategy Funds of Funds

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Fund of hedge funds (FoFs) are the instruments to allow individual investors to access the hedge funds industry. Fund of hedge funds can be constructed focusing on a specific type of hedge funds strategy. Single-strategy funds contrast with multi-strategy FoFs, which usually rebalance the assets allocated to a certain strategy according to changes in market conditions and investment views.

Single-strategy fund of funds have less flexibility as they are concentrated on one strategy only. When a certain strategy is not performing well, single-strategy

funds have little ability to move out, being at a disadvantage. Given that hedge funds' objective is to generate alpha, the ability to avoid certain strategies is a valuable alternative to FoFs, an alternative that single strategy FoFs do not possess. Both single-strategy and multistrategy FoF suffer from high management fees and incremental costs. Single-strategy funds aim to find the best hedge fund managers and to minimize single-manager risk. Diversification is limited by the fact that hedge funds require minimum investment amounts that may be significant when compared to the size of the FoFs net asset value. Typical hedge fund strategies are: convertible arbitrage, distressed securities, emerging markets, equity long biased and equity long only, equity long/short, equity short, market timing, event-driven, macro, sector funds, equity market neutral, merger arbitrage, statistical arbitrage, and fixed income strategies. Davies et al. (2006) argue that the apparent underdiversification of single strategy FoFs does not take into account improvements in the higher moments of the portfolio distribution and that skewness and kurtosis are most important in portfolio diversification.

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Skewness

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Skewness is the third centralized moment of a probability density function. It is meant to capture the asymmetry of a distribution (Kendall et al., 1998). A symmetric distribution (such as the normal distribution) has skewness of zero. A distribution with a thick right tail and a thin left tail has positive skewness (or will be right skewed), while the opposite is true for a distribution with negative skewness (or one that is left skewed).

Skewness has important ramifications for asset return distributions. Negative skewness is undesirable, since it implies that large, unexpected movements in the asset price are more likely to lead to large losses rather than large gains. Positive skewness, on the other hand, is more attractive because it implies that large movements in the asset price are likely to lead to large gains. A symmetric distribution implies that large movements are equally likely to lead to large losses or large gains. Many hedge funds, unfortunately, have return distributions that are negatively skewed.

Black–Scholes implied volatilities often exhibit a "skew" when plotted over time. One possible explanation for the volatility skew is that asset prices exhibit skewness, which the normal distribution does not allow.

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Sliding Fee Scale

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Sliding fee scale is a fee as a percentage of assets that increases or decreases over the life of a partnership. Investment firms commonly receive fees that decline as a percentage of assets as the managed asset size increases or a certain time period has past. In addition, investment firms can receive performance or success fees that increase as a percentage of assets as set targets are reached.

Examples of declining fees are investment banks that charge a finder or capital raise fee as a percentage of assets that decreases as the size of the assets purchased or sold increases. An another example would be private equity firms that charge management fees as a percentage of total committed capital, and later scale down this fee after the investment period has ended to reflect the reduced due diligence and transactions done by the general partner. A third example would be a fund of funds that charge investment management fees that decreases as a percentage of assets as the size of the assets invested increases.

Examples of increased fees are hedge fund managers who receive an incentive or performance fee that increases as a percentage of assets as certain return thresholds are met. Another example would be an investment bank that receives a success fee as a percentage of assets that increases if top dollar for assets sales are attained.

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Social Entrepreneurship

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Social entrepreneurship is the application of entrepreneurial approaches to social problems. In commercial entrepreneurship, private wealth creation and profit maximization are often the primary goals. In contrast, social entrepreneurship directly aims at solving social problems and creating social value. An example of a social entrepreneur often mentioned is the Nobel Peace Prize winner Muhammad Yunus who revolutionized micro credits and founded the Grameen Bank in Bangladesh.

Social entrepreneurship is part of the citizen sector, which has increased strongly over the last decades (Bornstein, 2004). Social entrepreneurship has caught the public attention in the United States during the mid 1980s and it is significantly increasing since the mid 1990s. An often cited, idealized definition of a social entrepreneur based on earlier works by Say, Schumpeter, Drucker, and Stevenson was given by Dees (2001). According to him, "Social entrepreneurs play the role of change agents in the

social sector, by:

- Adopting a mission to create and sustain social value (not just private value),
- Recognizing and relentlessly pursuing new opportunities to serve that mission,
- Engaging in a process of continuous innovation, adaptation, and learning,
- Acting boldly without being limited by resources currently at hand, and
- Exhibiting heightened accountability to the constituencies served and for the outcomes created."

But this is not the only definition; no universal definition has emerged yet. One important issue of debate is the question whether earned income strategies are a prerequisite for being a social entrepreneur. Common across all definitions is the focus on social value creation with an innovative approach (Austin et al., 2006). As long as the entrepreneur is primarily trying to solve a social problem, he might even use a for-profit-organization. Whether a nonprofit or for-profit-organization is chosen is solely determined by whichever organizational form is best suited to achieve the social entrepreneur's goals.

For commercial entrepreneurs, wealth creation is a proxy for value creation because efficient businesses make profits and inefficient businesses are driven out of the market. This mechanism does not work in the social entrepreneurship sector because "markets do not do a good job of valuing social improvements, public goods and harms, and benefits for people who cannot afford to pay. […] As a result, it is much harder to determine whether a social entrepreneur is creating sufficient social value to justify the resources used in creating that value" (Dees, 2001). To overcome this problem the social impact has to be measured, but at least so far this is a difficult, time consuming, and sometimes even impossible task.

The term social entrepreneur was coined by William Drayton, the founder of the organization Ashoka, which identifies and supports social entrepreneurs. Other organizations that support social entrepreneurs have followed, for example, foundations, venture philanthropy funds, and social venture capital funds. They are intermediaries offering private investors the possibility to invest money into social entrepreneurship. The financial rates of return these funds try to achieve range from minus 100% (only grants) to almost market rate returns.

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Social Venture Capital

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Social venture capital, also known as venture philanthropy (Letts et al., 1997), is a

term for an active, hands-on form of philanthropy that adopts methods used by traditional venture capitalists. There is no single approach to social venture capitalism as venture philanthropists adopt techniques on a selective basis from traditional venture capital methods; three of these are usually included in any discussion of social venture capital. First, social venture capitalists, like their traditional counterparts, do extensive due diligence. They think of their actions as *investments* rather than *grants* and they are highly selective. They closely evaluate various elements before they invest in a social or charitable organization, including the strength of their management team, the risks they face, and their opportunity to make an impact. Second, social venture capitalists closely monitor their investment and provide ongoing mentoring and support to the group. Finally, social venture capitalists carefully evaluate an organization's *scalability*, or their capacity to grow rapidly to address a particularly widespread social problem. For example, a venture philanthropist looking at a particular issue—famine in Africa—may provide seed funding to three or four agencies and then judge the success each of these has in dealing with the problem and evaluate which approach shows the greatest potential and progress. Once this evaluation phase is completed, the philanthropist looks to provide much larger amounts of money to the selected agency (Reis and Clohesy, 2001).

The social venture capital movement is not without criticism. Detractors argue that unlike traditional venture capital where a single measure—money—predominates, the not-for-profit world often has multiple objectives, many of which are difficult to measure. They also question whether scalability is realistic in the social context, given that any large organizational effort usually involves local governments and therefore cannot grow significantly without bureaucratic involvement. Finally, since the ultimate goal of a venture capital investment is a successful exit, it is not clear whether any parallel exists in the social sector (Sievers, 2001). Social venture capital can also be used as a term for a venture capital firm that includes specific social objectives as goals in addition to seeking a return on capital for its investors (Silby, 1997).

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Soft Commodities

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Commodities are generally classified into two sectors: *hard* and *soft*. Hard commodities include energy, industrial metals, and precious metals. Soft commodities are weather-dependent, perishable commodities

for consumption, such as agricultural and livestock products. "Softs" in the narrower sense are luxury foods, such as coffee, cocoa, sugar, and orange juice, which originate predominantly in tropical and/or subtropical regions. We can also categorize the following as soft commodities (Figure 1): food and consumer products (e.g., wheat, corn, soybeans, coffee, cocoa, and sugar), industrial agro-raw materials (e.g., cotton and timber), and animal agro-raw materials (e.g., feeder cattle, live cattle, and lean hogs).

Renewable commodities like grains can be produced virtually without limitation, except for the issue of farmland availability. The supply of some commodities exhibits a strong seasonal component. For example, metals can be mined almost throughout the year, but agricultural commodities may depend on a harvesting cycle. Soft commodities, furthermore, have storability limitations. Livestock, for example, is storable to only a limited degree. It must be continuously fed and housed at current costs, but it is only profitable in a specific phase of its life cycle.

Soft commodity price fluctuations are driven mainly by supply and demand imbalances originating from the business cycle or from unexpected weather patterns. Natural disasters caused by climate change or extreme cold, wetness, or drought can put agricultural commodity crops at risk, which inevitably leads to a price increase. In addition, the gradual switch from the use of fossil fuels to a larger dependence on biofuels has intensified demand for soft

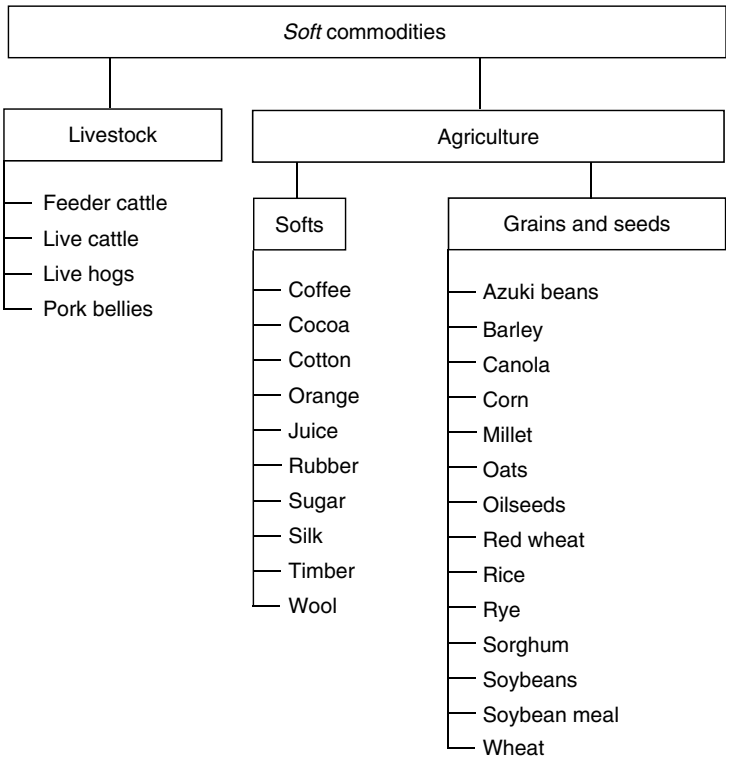

FIGURE 1
Soft commodities. (From Fabozzi et al., 2008.)

commodities and triggered a change in their use, for example, corn and sugar can increasingly substitute for gasoline.

World population growth and ongoing industrialization and urbanization in emerging markets have also triggered higher demand for soft commodities due to lower global storage. As a result of high price fluctuations, producers, exporters, and traders now commonly hedge their positions with commodity futures. Soft commodities futures contracts are traded mainly on the Chicago Mercantile Exchange, the Chicago Board of Trade, and the New York Board of Trade (Geman, 2005).

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Soft Dollars

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Soft dollars, as opposed to normal payments (hard dollars), stand as means to pay brokerage firms for research services (research products, hardware, software, subscription's database, etc.) through commission revenue.

In order to improve the efficiency and the competitiveness of financial markets, the Commission abolished in 1975 fixed commission rates and the Congress added Section 28(e) of the Securities Exchange Act of 1934 ("Exchange Act"), creating a "safe harbour" to protect advisers. To avoid conflicts of interests and regulate fiduciary duty, the Commission required advisers to disclose soft dollar arrangements to their clients.

Section 28(e) states "…that a person provides brokerage and research services insofar as he/she:

1. furnishes advice directly or through publications or writing as to the value of securities, the advisability of investigation of investing in purchasing or selling securities, or the availability of purchasers or sellers of securities;
2. furnishes analyses and reports concerning issuers, industries, securities, economic factors and trends, portfolio strategy, and performance of accounts;
3. effects securities transactions and performs functions incidental thereto (such as clearance, settlement, and custody) or required therewith by rules of the Commission or a self-regulatory organization of which such person is a member or person associated with a member or in which such person is a participant"*.

"…Section 28(e)(2) grants the Commission rulemaking authority to require that investment advisers disclose their soft dollar policies and procedures, as 'necessary or appropriate in the public interest or for the protection of investors'."†

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Sortino Ratio

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The Sortino ratio, first introduced in 1980 by Frank Sortino, is similar to the Sharpe ratio, and is an example of a risk-adjusted comparative performance statistic. However, unlike the Sharpe ratio, the Sortino ratio does not penalize investments for upside volatility. The Sortino ratio is based on the theory that upside volatility is good, so it employs downside deviation instead of standard deviation in the denominator of the formula, and it substitutes a minimal acceptable return (MAR) for the risk-free rate. In other words, the Sortino ratio equals the return minus the MAR, divided by the downside deviation. The formula for the Sortino ratio is as follows:

$$\text{Sortino ratio} = \frac{\text{compound period return} - R_{\text{MAR}}}{\text{DD}_{\text{MAR}}}$$

where R_{MAR} is the minimum acceptable return for the period and DD_{MAR} is the downside deviation, calculated as

$$\text{DD}_{\text{MAR}} = \left(\frac{\sum_{I=1}^{N} (L_I)^2}{N} \right)^{1/2}$$

where $L_I = R_I - R_{\text{MAR}}$ (if $R_I - R_{\text{MAR}} < 0$) or 0 (if $R_I - R_{\text{MAR}} \geq 0$) with R_I being the return for period I and N the number of periods.
Annualized Sortino ratio:

$$\text{Annualized Sortino} = \text{Monthly Sortino} \times (12)^{1/2}$$

$$\text{Annualized Sortino (Quaterly data)} = \text{Quarterly Sortino} \times (4)^{1/2}$$

Table 1 highlights the difference between the Sharpe and Sortino ratios using two fictitious managers. Manager A focuses on equity investments, while manager B focuses on bond investments. As with most risk-adjusted comparative returns, the higher the value, the better.

We can see from this comparison that both the bond-focused and equity-focused hedge funds have approximately the same Sharpe ratio (0.69 and 0.64). However, if our goal is to achieve a MAR of 10%, the Sortino ratio heavily favors stocks (0.37). For lower MARs, the Sortino ratio favors bonds in this example.

TABLE 1

Differences between the Sharpe and Sortino Ratios

	Manager A	Manager B	Winner
Sharpe Ratio (5% risk-free rate)	0.64	0.69	Manager B
Sortino Ratio (MAR = 10%)	0.37	−0.14	Manager A
Sortino Ratio (MAR = 5%)	0.88	1.15	Manager B
Sortino Ratio (MAR = 0%)	1.48	3.01	Manager B

Soybean Market

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The Soybean Market is major grain commodity, in the United States, typically planted in the month of May and harvested in September or October of the same year. Soybeans grow mainly in the upper Midwest part of the United States, but are also found in the south and southeast. Upon harvest, most soybeans are crushed to produce either soybean oil or soybean meal, however, some whole soybeans are roasted and eaten as snacks or used in foods such as tofu. Soybean meal is the largest source of protein for livestock and soybean oil is used in oils, salads, and margarine. Soybean oil is the largest source of vegetable oil in the United States. Futures contract in soybeans are traded on the Chicago Board of Trade, in quantities of 5000 bushels and are used by both end users for price protection and speculators who wish to profit. Cash prices for Soybeans currently average about $9.00 per bushel, with 3.2 billion bushels supplied and total usage (demand) of about 3 billion, for a market surplus of 200 million bushels. The United States is the world's largest producer and exporter of soybeans.

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Speculator

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When dealing with futures, three broad types of traders can be identified: hedgers, arbitrageurs, and speculators. A speculator has a view on the future movements of a market and can use futures contracts to bet on his outlook. Consider, for example, a speculator who believes that a certain asset price is likely to increase. One possibility of betting on this price movement is to take a long position in a futures contract on this asset. The difference from a purchase in the spot market is that the futures market allows the speculator to obtain leverage. Speculators can be divided into three groups according to the term of holding a position: scalpers, day traders, and position traders (Hull, 2006). Scalpers are watching for very short-term trends, usually a few minutes, and attempt to realize profits from small changes in the contract price. Day traders hold a contract for less than one trading day and do not take the risk of potential bad news overnight. Position traders hold their contracts for a much longer period and look forward to significant profits from major movements in the market.

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Spin Off

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A spin off is a divestiture, where a division of a company is turned into an independent business. The subsidiary is now a separate legal entity with an independent management. Shareholders of the parent company usually receive shares of equal value to their former holding in the new company. In contrast to a sell off, usually no cash is generated. Companies often sell unproductive or non-core subsidiary businesses as a spin off. The main reason for this is that the value of the parts of the separated companies is supposed to be greater than before, thus increasing shareholder value. The management of the spin off is set free from the parent company. This provides new incentives as it can now focus exclusively on the opportunities of the special business segment. Furthermore, spin offs have to issue separate financial statements, so that shareholders receive more detailed information concerning the performance of the company. This helps attract more investors. On the contrary, expenses in marketing, administration, and research tend to rise with the business now operating on its own. Raising capital from banks or institutional investors might also be more difficult for smaller companies. Partial spin offs are also known as equity carve outs. In this case, the parent company only sells a minority of shares in a subsidiary keeping a controlling stake. The rest of the shares are usually spun off later when the stock price has risen. Spin offs also refer to university research groups or business incubators setting up a new company.

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Spot

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The spot price, also called spot rate, is the price that is quoted for immediate payment and delivery. In the case of foreign exchange the settlement usually takes place one or two business days after the trade day. In the spot market for commodities, the time span from the trade day to the settlement day can take up to one month. This is in contrast with a forward or futures contract, where the price is set today but the delivery will occur at a fixed date in the future, often 3–6 months. Interestingly, even the so-called spot indices do not measure the actual spot prices but rather the prices of nearby futures contracts (see, e.g., Goldman Sachs commodity spot indices). This is because the spot market is highly illiquid for some commodities, such as crude oil, and thus has to be approximated. The spot-future parity states that the connection between the spot price S_t and the futures price $F_{t,T}$ with maturity at time T is as follows: $F_{t,T} = S_t e^{(r+c-y)T}$, where r is the risk-free interest rate.

In the case of commodities, the storage costs c and the convenience yield y from holding the commodity in storage have to be considered as well. If the equation is not met, a risk-free profit can be realized. Although the futures price $F_{t,T}$ theoretically should be an unbiased expectation of future spot prices $E[S_T]$, forecasts based on spot prices have been found to be as good as forecasts based on futures prices (French, 1986). This can be traced back to market imperfections such as transaction costs, tax distortions, and unequal distribution of information.

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Spot Commodity

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On the spot market (also called physical market or cash market) the traders buy or sell commodities for cash at the current (spot) price determined by the characteristics of the supply and the demand of each commodity (Downes and Goodman, 2003). A physical delivery is expected to be done immediately or as the case may be within a commodity-specific time period. Unlike in commodity future markets, there is no cash settlement. The spot price normally means free on board (FOB). Future prices are determined by the spot price of a commodity. Accordingly, spot commodity price P_{Spot} can also be calculated through the present value of a future contract P_{F} considering the risk-free rate r, the cost of storage c, the convenience yield y, and time to maturity of the future contract t (Pilipović, 1998):

$$P_{\text{Spot}} = \frac{P_{\text{F}}}{e^{(r+c-y)t}}$$

At maturity the price of a commodity future is the same as the spot commodity (Gorton and Rouwenhorst, 2005). During its expiring month, a future, therefore, can also be called spot commodity. Index provider like Commodity Research Bureau, Goldman Sachs, Dow Jones, Standard and Poor's, Morgan Stanley, Lehman Brothers, Merrill Lynch, and Deutsche Boerse calculate spot indices for single commodities or groups of commodities.

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Spot Month

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The spot month is the contract month of a futures contract, which is the present calendar month. It is the adjacent month in which the commodity could be delivered in order to satisfy the contract. The delivery date is one of several features of a futures contract,

which references the spot month; this is the date on which the parties are required to complete the terms of the contract. Delivery on a contract is typically determined on a specific day or days of the month; trading in the futures contract comes to an end on or prior to the delivery date. For example, "the Brent Crude oil futures which are traded on the International Petroleum Exchange in London have monthly delivery dates over the next 12 months, quarterly delivery dates for the following 12 months and half-yearly dates for the following year afterwards. Trading in the Brent Crude oil futures for a specific delivery month stops trading on the trading day immediately before the 15th day before the first business day of the delivery month (Levinson, 2006)." This delivery month is also referred to as the spot month as this is when the commodity may be delivered to settle the contract.

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Spreading

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A trading strategy consisting of simultaneously purchasing and selling of two different but related futures contracts is called *spreading* or a spread trade. The spread is simply the price difference between both the futures contracts. Traders start spread trades when they believe that the price differences between two contracts will alter to their benefit before the trade is offset. A spread position is usually less risky than assuming a complete position in the market as the two positions are presumed to partly hedge each other. Spread positions can be classified into at least three broad categories: interdelivery spread, intercommodity spread, and intermarket spread.

When a spread trade entails futures with two different contract months but written on the same underlying commodity, it is defined as an interdelivery spread. This is a broadly used kind of spread trade and two well-known strategies are the bull spread and the bear spread. (For more details see Interdelivery spread.)

An intercommodity spread involves simultaneously purchasing one futures contract and the selling of a different but related futures contract that expires during the same month. Intercommodity spread traders must be careful about the choice of the two underlings they combine. Any two contracts will not do, contracts should be related so their prices normally increase or decrease jointly, or at least their price difference should tend to follow pattern. Typical choices are: contracts whose underlings compete with each other—for example, cattle (beef) and hogs (pork) contracts at the Chicago Mercantile Exchange (CME); contracts whose underlings can be affected by the same general event—a drought would affect both corn and wheat, contracts at the CBOT; or contracts where one commodity is physically derived from another—for example, oil and gasoline contracts traded at Euronext Liffe.

Two famous intercommodity spreads are the crack spread and the crush spread. The name of the crack spread strategy is derived from the fact that "cracking" oil creates gasoline and heating oil. The strategy is generated by buying oil futures and selling gasoline and heating oil futures, and the investment alignment permits the investor to hedge against risk as a result of the offsetting nature of the underlings. A crush spread uses in the soybean futures market and consists of simultaneously purchasing soybean futures and selling soybean meal futures. (See also Intercommodity spread.) The intermarket spread involves buying and selling the same futures contract—same commodity and delivery month—at two different exchanges, even in two different countries. Example of futures contract on a same underlying traded in various exchanges are, for example, gold futures, which are traded in Chicago, New York, and London exchanges or cotton, copper, and sugar that are traded in New York and London. In many exchanges, the most famous spreads can be traded directly, that is, a trader would not need to give two different orders simultaneously; rather she would give only one order directly on the spread and quote the price difference of the two positions. Spread strategies are traded in both electronic and open outcry trading exchanges.

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Staging

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The term "staging" refers in venture capital finance to the stylized fact that capital contributions of investors to portfolio firms are typically portioned, for example, capital staged. This behavior relates to the problem that during the financing of start-up ventures (non) verifiable information about project value is becoming available only successively. The cash provisions to the start-up companies are such that the next performance milestones are attainable. Hence, by staging capital provisions venture capitalists are able to check whether the expected net capital return of investing in the next project stage is still positive. Previous investment costs are sunk.

The economic rationale to this behavior is that ceteris paribus (c.p.) the ex ante overall firm value, is higher compared to a situation where the founder gets the whole planned investment sum upfront. This is because the founder usually invests none or little of his own capital but participates proportionally in the total project returns. Hence, there is the possibility that he does not have the right incentives to abandon timely projects with an overall negative capital return.

Theoretical analyses have shown that the efficient decision about project continuation should be transferred to an informed investor, that is, a venture capitalist, whereby the detailed specification of the financing contract depends on further circumstances. For example, there could be informational

asymmetries between the project founder and the venture capitalist caused by "window dressing," that is, the manipulation of signals about project quality by the project founder. In such cases the combination of capital staging and convertible securities could provide an efficient solution.

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Stale Pricing

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A stale price determines the current value of a security based on the price of a past trade and reflects no new information, which may have surfaced in the meantime. Hence, stale pricing can serve as a trading strategy and also smooth fund returns. The time lag mentioned, in combination with newly available information, enables a relatively precise prediction of the security price for the next trade.

The reason for the predictability of mutual fund returns is based on the industry standard to fix the net asset value (NAV) of a fund only once every day at 4 pm eastern time. The fund evaluates its portfolio positions with the last available market price, which may have been observed long before 4 pm when dealing with illiquid positions or non-US exchanges (Zitzewitz, 2002).

There are a number of hedge funds that specialize in exploiting this time lag advantage also called "market timing." In order to restrict or at least limit the use of stale prices, which is harmful for long-term investors, the Securities and Exchange Commission (SEC) executes pressure on the mutual fund industry to calculate their NAV via "fair prices," or to relate their fees to the holding period of fund investors—short-term investment, higher fees. Hedge funds as well as private equity funds invest in illiquid and irregularly priced securities, which contribute only via estimated values and not as marked-to-market positions to fund performance. An investigation of the returns has shown that the corresponding volatility, the correlation with traditional asset classes, the autocorrelation, and therefore the risk of the investment are positively distorted. This also influences the shape of the efficient border of a risk/return optimized portfolio (Asness et al., 2001).

Neutralizing the stale pricing effect results in a substantial increase in risk connected with alternative assets; however, this does not harm the importance of hedge funds and private equity concerning their diversification effect on traditional asset classes. Only the respective weighting of the portfolio constituents is shifted toward risk minimization (Connor, 2003).

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Standard Error

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When one speaks of the standard error, one must specify the statistic that is considered (mean, proportion, variance, difference between means, difference between proportions, median, etc.). But usually in practice, when we talk about standard error, we very likely mean the standard error of the mean.

If we have a sample of N observations of a random variable X (for instance, returns of an investment over N time periods), the sample standard deviation measures the variability of the observations within the sample. However, different samples of the same size N will produce different values of the mean $\overline{X}$. The standard error measures the variability of the sample means, $\overline{X}$, that is, a measure of the average deviation of a set of sample means from sample to sample (Keller and Warrack, 2003; StatSoft, Inc., 2007; Higgins, 2004; Black, 2005). The estimated standard error of the mean is given:

$$SE = \frac{SD}{\sqrt{N}}$$

where N is the sample size and SD is the sample.

Note that the above formula computes the estimated standard error because the calculations are based on a single sample of size N and the sample standard deviation is obtained as follows:

$$\text{SD} = \sqrt{\frac{\sum_{i=1}^{N}(X_i - \overline{X})^2}{N-1}}$$

It is clear by looking at the above formulas that as the sample size increases, sample standard deviation goes up and down in small amounts, but it does not consistently increase or decrease, and it gets closer to the true population standard deviation. On the other hand, the standard error of the means consistently decreases as the sample size increases, and the sample mean gets closer and closer to the value of the true population mean. Note that many uses of the standard error as defined above implicitly assume a normal distribution. Another use of the standard error is in the calculation of confidence intervals. For a large sample, $\overline{X} \pm 1.96 \times SE$ constitutes a 95% confidence interval for the population mean (Keller and Warrack, 2003; Higgins, 2004; Black, 2005).

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Statistical Arbitrage

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Statistical arbitrage portfolios are long/short portfolios (i.e., self financing) that attempt to create profits from the statistical properties followed by a particular group of assets. If prices deviate from the estimated historical relationship, an arbitrage portfolio is created. Statistical arbitrage strategies attempt to benefit from empirical regularities without the need for a strong theoretical underpinning in economic theory. Consequentially, most techniques employed in this field work with daily (or higher frequency) price data and much less with other economic or financial data. The techniques involved employ sophisticated statistical algorithms. The most well-known examples are pairs trading and volatility pumping. The first strategy attempts at identifying a pair of two securities that are glued together by a statistical relationship (cointegration) that results into a mean reverting spread between both securities as described in Alexander et al. (2002). Volatility pumping is a strategy related to the work by Fernholz (2002). The investor takes a long position in a high-frequency (intraday) rebalanced equal-weight portfolio and a short position in a low-frequency (daily) rebalanced equal-weight portfolio. While both portfolios should have the same expected average return, the difference in geometric return should grow over time as the continuously rebalanced portfolio remains more diversified and as such suffers from a lower variance drain.

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Sterling Ratio

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The Sterling ratio provides comparative information for a risk-adjusted assessment of drawdown analysis. Created by commodity fund operator Dean Jones of Reno, Nevada, the Sterling ratio is similar to the Sharpe and Sortino ratios in that it measures return relative to risk. However, in the case of the Sortino ratio, risk is measured by maximum drawdown. The Sterling ratio is the annualized return for the last 3 years divided by the average of the maximum drawdown in each of the preceding 3 years, plus an arbitrary 10 percent. Jones added the extra 10 percent to the drawdown as he believed that all maximum drawdowns would be exceeded in the future.

To calculate this average yearly drawdown, the latest 3 years (36 months) is divided into three separate 12-month periods and the maximum drawdown is calculated for each. Then these three drawdowns are averaged to produce the average yearly maximum drawdown for the 3-year period. If 3 years of data are not available, the available data is used.

$$\text{Average drawdown} = (D1 + D2 + D3) \div 3$$

$$\text{Sterling ratio} = \text{compound annualized ROR} \div \text{ABS (average drawdown} - 10\%)$$

$$\text{Sterling ratio} = \frac{\text{average ROR (last 3 years)}}{\text{absolute (average drawdown} - 10\%)}$$

Where $D1$ = Maximum drawdown for first 12 months; $D2$ = Maximum drawdown for next 12 months; $D3$ = Maximum drawdown for latest 12 months.

Much like other comparative, risk-adjusted statistics, the higher the Sterling ratio, the better. A high Sterling ratio means that the fund generates a higher return relative to its downside risk.

Stress Testing

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In risk management, the notion of "stress test" refers to some extraordinary situation occurring very rarely but whose consequences would be dramatic for a given portfolio. Such situations are usually outside the scope of normal market conditions, but they need to be envisaged and their consequences need to be understood. Stress testing therefore helps hedge fund managers to determine how their portfolio would react in *stylized scenarios.* It gives them a better understanding of where extreme risks lie in their portfolios, and allows them to prepare so that they are able to act more decisively and more quickly if the worst-case takes place unexpectedly.

Measuring the volatility and/or value at risk (VaR) of a portfolio provides objective measures, which are usually based on some statistical observation of the past. By contrast, stress testing is a subjective risk-measurement approach that depends mainly on human judgment and experience. At its simplest, a stress test will show the sensitivity of a portfolio to a certain change in some underlying risk factors. These changes (called "scenarios") can be based on historical data (October 1987, summer 1998, etc.) or can be hypothetical and entail large movements considered being possible.

Stress tests are helpful for evaluating the effects of large movements in key variables. Hedge funds often use them as a complement to statistical models such as VaR to capture the impact on a portfolio of exceptional but plausible large loss events, understand the overall risk profile of a fund, set limits, and take capital allocation decisions. However, one should also be aware of the limits of stress test models. In particular, they usually assume that the portfolio stays unchanged over the stress test period, and are often not able to capture the entire spectrum and interplay of risk exposures (such as operational risk, legal risk, liquidity risk, etc.). As an illustration, many hedge funds run a summer 1998 scenario on their portfolio but they do not model the lack of liquidity associated with this crash.

Stressed Markets

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The occurrence of periods of stress in international financial markets has been a challenge to economists and financial

researchers for long. Academic interest in exploring underlying economic forces goes back, at least, to the great depression of the 1920s. More recent prominent examples of periods of stressed markets include the crash of 1987, the so-called 1989 mini-crash, the 1997 Asian currency crisis, and the 1998 Russian debt crisis, which caused the collapse or near collapse of several financial intermediaries worldwide. Also, a purely exogenous event such as September 11, 2001 caused substantial market stress. Furthermore, various other recent cases of market stress and related cases of individual financial distress add to a growing interest in understanding periods for stressed markets. Sometimes, although less frequently, stressed markets may also relate to run-ups in prices; a large stock market run-up with the start of the Gulf War in January 1991 may serve as an example. Also, market stress may sometimes not at all be obvious from overall period price changes; a typical example would be frequently observed trading patterns such as so-called "one-day reversals." These tend to occur under high intraday volatility as well as hectic trading but typically do not end with large overall price movements on a market close-to-close basis.

The above observations led to the concept of "stressed markets," which is assigned to situations during which unusual economic circumstances prevail. One then distinguishes related market behavior from what is otherwise assumed to be "normal." This concept makes the analysis of markets under stress a separate and relatively recent research topic. A central characteristic of stressed markets is heavy intraday trading activity that goes along with high intraday price volatility. Such periods are obviously of particular relevance for risk management as well as financial engineering applications.

During recent decades, important advances have been made in the area of economic models, which aim at an explanation of market stress and the occurrence of crashes. Stress dynamics critically depend on the nature and diversity of market participants, their motives for entering the market, and the extent of consistency in their response to worsening conditions. While economic models make assumptions about the underlying market structure, the potential diversity in the economic background also calls for empirical methods in the study of market stress. Such methods include quantitative approaches in finance, which take care of the special stress circumstances as well as frequent approaches based on extreme value theory.

How do securities behave in situations of market stress? Important empirical observations of market behavior under stress, which is different from normal behavior, include two main areas: nonlinear cross-sectional dependence between and liquidity and nonlinear dependence between asset returns. Consider the following first point: nonlinear cross-sectional dependence between assets returns relates to a typical observation under periods of market stress in that asset return correlations seem to be different than under normal market conditions. In particular, correlations during strong market downturns seem to be higher than otherwise. This "diversification meltdown" may partly explain increased risk and the sharp movements in overall market indices. However, there is evidence that behavior is stable in a statistical sense. In other words, it is a standard feature of a complex asset return dependence structure, which is nonlinear and not fully described by a linear dependence concept such as correlation. The feature obviously affects

risk-management decisions and also indicates that standard methodologies would underestimate risk during market stress.

The second point is even more involved since we commonly assume that market volatility under normal market conditions is driven by information arrival and trading activity. However, under market stress, the patterns may not hold. Liquidity, which is a constant side variable under normal market conditions, starts to play a dominant role under market stress. As such, nonlinear asymmetric relationships appear. The Bank for International Settlement's Quarterly Report for the year 2000 commented that: "The illusion of permanent market liquidity is probably the most insidious threat to liquidity itself."

While markets, typically, become more liquid as prices rise and more participants enter, they become sticky when many participants want to exit at the same time. Risk management is affected by potential market stress, which implies that common assumptions on market mechanics are violated. Such assumptions include that the liquidation of a position would have no effect on the market, that positions can be liquidated in a relatively short time period, and that the bid-offer spread remains stable. As such, empirical evidence indicates that during times of stress, bid-offer spreads widen and market depth may become asymmetric between the buy and the sell side. Also, the effect of order flows on price movements becomes stronger. At the same time, no single measure so far seems fully appropriate to capture market liquidity or liquidity risk.

An incomplete list of studies, which address the topic of stressed markets and also include further references, Chen et al. (2001), Danielsson and Saltoglu (2003), Diebold and Santomero (1999), Dufour and Engle (2000), Furfine and Remolona (2003), Gennotte and Leland (1990), Jacklin et al. (1992), Jansen and de Vries (1991), Jorion (2000), Longin and Solnik (2001), Marsh and Wagner (2000) and Straetmans et al. (2003).

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See also: Market Crashes, Liquidity, Extreme Value Theory, Portfolio Insurance, Hedging, Risk Management.

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Strike Price

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Strike price is the prespecified price that a buyer or a seller of a derivative contract agrees to use to purchase or sell an asset. It is also known as the exercise price. For example, in a call option for an XYZ company stock, the buyer of the contract has the right to purchase the XYZ company stock on or before delivery date for the strike price of X, but not the obligation. If at the expiration, strike price is above the existing spot/market price, this option contract becomes *out-of-the-money* and the holder of the contract prefers to let the contract expire. On the other hand, if the strike price is below the existing market price at the expiration, the contract becomes *in-the-money* and exercising the contract creates a positive gain for the holder. For a put option, the holder of the contract has the right, but not the obligation, to sell the stock at the strike price on or before the expiration date. If the existing market price of the stock is below the strike price, put option contract becomes *in-the-money* and the holder of the contract prefers to exercise it. However, if the strike price is below the market price, the holder of the contract lets the contract expire without exercising it.

Strong Hands

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The term "strong hands" refers to the ability/willingness of futures market participants to hold on to market positions in the face of adverse price moves. Since the margin requirements for the purchase or sale of a futures contract represent only a tiny fraction of the value of the futures contract, on average approximately 5% of the value, it is possible for market participants to obtain very significant leverage in the futures markets. And although the leverage would act as a multiplier to increase returns if the participant correctly anticipates the direction of the price movement, either up or down, of the commodity or financial instrument that is represented by the futures contract, an adverse price move can result in significant losses due to this same multiplier effect. Many small investors are quickly forced to liquidate their positions during an adverse price move. However, there is a class of market participant that is well capitalized, has a long-term view with respect to the direction of price and the conviction/ability to sustain temporary losses in pursuit of greater rewards. This group of investors is usually described as having "strong hands."

Structured Products

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Structured products are complex synthetic products designed to give exposure to assets or investment strategies via a single instrument. Structured products are generally listed and tend to be issued through private placements to professional investors or via public offering to general investors subject to local regulation. Structured products often span different asset classes and often embed derivatives.

Structured products have at least one of four characteristics:

- **Access provision**—the structure gives investors exposure to assets they might otherwise find impractical to trade. Let us consider a retail investor who would like to invest in a particular fund of hedge funds. The fund has a minimum investment of $250,000, but the retail investor only has $50,000 available, so the retail investor has no direct access to the fund. However, it may be possible to get access via a structured product that offers identical performance to the fund. To achieve this, the structurer invests a large sum in the fund on wholesale terms and repackages it into units small enough to allow the retail investor to buy.
- **Principal protection or loss limitation**—the product provides directional exposure to an underlying asset in one direction only. A simple example would be a note linked to an equity index, which, at maturity, pays back at least the initial investment, and also a large fraction of the performance of the equity index if positive. This can be achieved in a number of ways, but a simple way would be to buy a zero coupon bond that pays 100% of the principal at maturity at a discount. The remainder is then invested in a call option on the equity index struck at today's price. Whatever happens, the bond matures to pay back the original investment. If the index rises, the call option also pays out the performance of the equity index. The actual exposure depends on the relative costs of zero coupon bonds and options on the underlying and is commonly called the "participation rate."
- **Leverage**—the structure provides leveraged access to an underlying asset, that is, it pays a multiple of the return on the underlying asset. Structures with leverage usually embed a mechanism to limit losses to the amount of principal invested.
- **Algorithmic trading rule products**—structures that invest in assets according to a specified rule set. There may be one or many underlyings, and the algorithm could define the constituents of an index forming the underlying asset depending on prevailing market conditions, or it could define buy or sell points of underlying assets according to the trading rules.

SYSTEMIC RISKS

Nowadays, structured products are usually carefully constructed with market impact

as well as risk control in mind. However, historically they have set up unexpected feedback loops in the underlying market. An early structured product, the *portfolio insurance note*, is now widely believed to have contributed to the 1987 stock market crash.

In mid-October 1987, 2%–3% of the market capitalization of the Standard & Poors 500 (S&P) was covered by portfolio insurance. Portfolio insurance is an algorithm, which calls for selling of the underlying asset if it falls to a predefined level and repurchase it if it subsequently rises. As the market started falling on Thursday, October 15, 1987, a few sell orders were generated as a result of portfolio insurance. On Friday, the S&P fell further, triggering many more sell orders and the futures market closed with a large backlog of sell orders. The 20.4% drop in the S&P on Monday was inevitable. Market participants had failed to fully analyze the mechanism, size, and uniformity of portfolio insurance.

The crash of 1987 was an especially severe case, and serves as a lesson in proper construction of structured products, not a blanket warning against the use of structured products. The basic lesson, not to allow the market to become too concentrated in one risk or another, is now well understood in the context of structured products. Nowadays, structurers usually consider market impact as part of internal risk assessment while creating structured products.

COMMON EXAMPLES

Because they are customized solutions, the possible variety of structured products is almost endless. However, some common examples include:

- **Delta-one notes**—a note that provides the same returns as an underlying product. These are pure access products.
- **Principal protected note (PPN)**—protects the initial investment while giving some level of participation in the upside returns of a risky asset. A PPN may comprise a zero coupon bond and a call option on the risky asset, giving constant participation in the upside of the risky asset regardless of its subsequent path. A PPN may also take the form of a portfolio insurance strategy that starts with full (or higher) participation in the underlying, and reduces participation should the underlying fall. In other words, participation and eventual payoff is path dependent. The expected outcome of these two PPN variants is the same if initial conditions are the same and leverage is not allowed. If leverage is allowed, the expected outcome of portfolio insurance-based PPNs is generally better than that of option-based PPNs because in portfolio insurance strategies leverage is only employed if the path of the underlying is upward. The cost of leverage is not incurred when the underlying performs badly.
- **Autocallable note**—allows investors to profit from a range-bound underlying, paying a coupon provided the underlying remains below a specified threshold level. However, should the underlying trade down to a predetermined, the holder only receives the actual performance of the underlying.

- **Reverse convertible note**—protects the investor's principal and pays a high coupon as long as the underlying remains below a predetermined level. However, if the product falls to a lower predetermined level, the coupons fall and could become negative. This is equivalent to being long a zero coupon bond and short a down-and-in put.
- **Airbag**—protects the investor from a small crash in markets, but not a large one. Airbags are equivalent to a long at-the-money put and short more than one out-of-the-money puts.

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Style Analysis

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Style analysis is used to analyze the performance of an investment manager. The most proper way to analyze the skill of an investment manager is to compare the returns of a fund to the risk-adjusted return of a benchmark index that closely represents the manager's investment style. Style analysis can be used to explain the return to hedge funds, mutual funds, or other managed accounts. This tool is most useful for hedge funds and other types of investment products that do not frequently disclose their holdings or their investment process. Style analysis, then, can be used to explain a fund's trading style, even when the positions or trading style are not disclosed by the fund manager.

Jensen's alpha can be used to measure the skill of an investment manager.

$$\alpha = R_{i,t} - \beta i R_{B,t} + \varepsilon$$

A manager demonstrates investment skill when the alpha is positive, that is when the return on the investment portfolio exceeds the risk-adjusted return of the benchmark. Unfortunately, some investment managers or strategies may claim to be an absolute return strategy, which may not have a relevant benchmark. Sharpe's style analysis can be used to determine the beta exposures (βi) and the relevant benchmarks (B). Once the beta coefficients and benchmarks are known, we can calculate the skill of the manager with α. It is important to include all potential benchmarks in the analysis. If some market factors are missing from the analysis, the analyst may mistake skill for what is actually an exposure to market risk.

William Sharpe (1992) uses the following regression to perform style analysis

$$R_{p,t} = \sum i\beta_{p,i} Factor_{i,t} + e_{p,t}$$

This regression requires a time series of returns to the investment fund as well as the historical returns of a variety of investment benchmarks. The beta for each factor or benchmark is analyzed. If the beta coefficient of a factor is statistically significant, it is said that the manager is taking an economic exposure to the factor. If the beta of the fund to a given benchmark is not

statistically significant, it is removed from the regression as it has been shown that the benchmark does not adequately explain the returns of the fund. The higher the *r*-squared of the regression, the more completely the market exposures explain the return of the fund. In a traditional investment fund, the analyst may constrain the coefficients to be positive as it is not expected that the fund manager has sold short any securities in the fund. While Jensen assumes a single benchmark in the traditional alpha calculation, Sharpe explains that a fund manager may take consistent exposure to two or more market risk factors. The alpha estimate, then, is the return on the fund in excess of the sum of each significant beta coefficient multiplied by the return to each significant market benchmark.

Appropriate benchmarks for an equity fund include

- large, medium, and small cap indices for both United States and international equity markets;
- growth, value, and core indices for both United States and international equity markets.

While appropriate benchmarks for a fixed income fund include

- long, medium, and short duration indices for both United States and international bond markets;
- high, medium, and low credit quality for both United States and international bond markets.

Hedge funds are more flexible in their trading strategies, so they require a wider variety of factors to explain their return. Black (2007) includes many of the above factors that are traditionally used to explain the returns to long-only equity and fixed income funds. Additionally, hedge fund style analysis may include the slope of the yield curve, emerging markets, equity and fixed income volatility, and currency and commodity indices. Many hedge funds take significant liquidity risk, so it is also suggested to include the lagged return to the hedge fund in order to detect the degree of smoothing or illiquidity in the returns. Black shows that over 80% of the returns to the HFR hedge fund index from 1990 to 2004 can be explained by exposure to US large and small cap stock indices, emerging markets, and high-yield bonds. If hedge fund returns are largely derived from market risk exposures, the alpha is smaller than previously believed, and the returns to a hedge fund may have a larger than desired correlation to these market benchmarks. Because many hedge fund strategies require short selling, it is suggested that the beta coefficients be allowed to take either positive or negative values.

The results of style analysis can be useful for a number of discussions with an investment manager. First, has the manager demonstrated skill, or have the returns simply come from an exposure to common market benchmarks? Second, has the manager consistently taken exposure to the same factors (style purity) or is there a tendency to change exposures over time (style drift)? We would also like to know if the style analysis confirms the stated style of the fund manager, or suggests a different set of risk factors. Finally, if the *R*-squared of the style analysis is high and the alpha is low, investors may wish to replicate the fund using market index products or exchange-traded funds. This replication strategy can be used to reduce fees and better understand and control the factor exposures of the investment fund.

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Style Drift

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When a fund departs from its declared investment strategy over time we speak of style drift (or style rotation). Fung and Hsieh (1997) propose to break down style by location and strategy. Location refers to the type of assets the manager invests in, and strategy describes whether the hedge fund adopts, for example, a buy-and-hold, long/short, or trend following trading pattern. Hedge funds can drift away from their initial style along these two dimensions. Managers that employ a specific fund strategy that no longer promises to be successful may be tempted to drift away strategically from their original style and adopt new strategies to improve their performance.

A fund that drifts away from its declared investment style or switches between strategies becomes inconsistent. As an investor you expect the hedge fund to represent a certain investment style, and style drift can induce a major shift in the statistical properties of the overall portfolio returns. Style drift also complicates monitoring a manager's performance, classifying hedge funds to form peer groups, and studying the performance persistence among hedge fund managers. One caveat is that for some hedge funds the latitude to adapt their style is an integral part of their investment style; for example, in the case of multi-strategy funds—to name only the most obvious category.

A rolling window for Sharpe's (1992) return-based style analysis is a commonly used technique to monitor style drift (in particular for mutual funds). Return-based style analysis regresses the hedge fund returns on a set of style benchmarks with no intercept and the constraints that the coefficients sum up to one and are non-negative. Depending on the choice of style benchmarks, this latter constraint can be relaxed for hedge funds. Style benchmarks can be specified as *asset-based style factors* (such as large and small stock indices, high-yield bond indices, returns on passive option strategies), *return-based style factors* extracted using principal component analysis, *peer group based style factors*, or returns on primitive trading strategies. The length of the time window is somewhat arbitrary but for monthly data 36 months is a common choice. Every month the return-based style analysis is repeated, and plotting the series of coefficients for the set of style benchmarks over time provides a graphical illustration of the style history. For an extensive discussion of return-based style analysis and its application to hedge funds the reader is referred to Ben Dor et al. (2003).

As an example, let us consider the HFR Equity Hedge Index, which represents the strategy long/short equity. Fung and Hsieh (2004) describe this style as a combination of a long position in the S&P 500 and a positive exposure to the spread between small

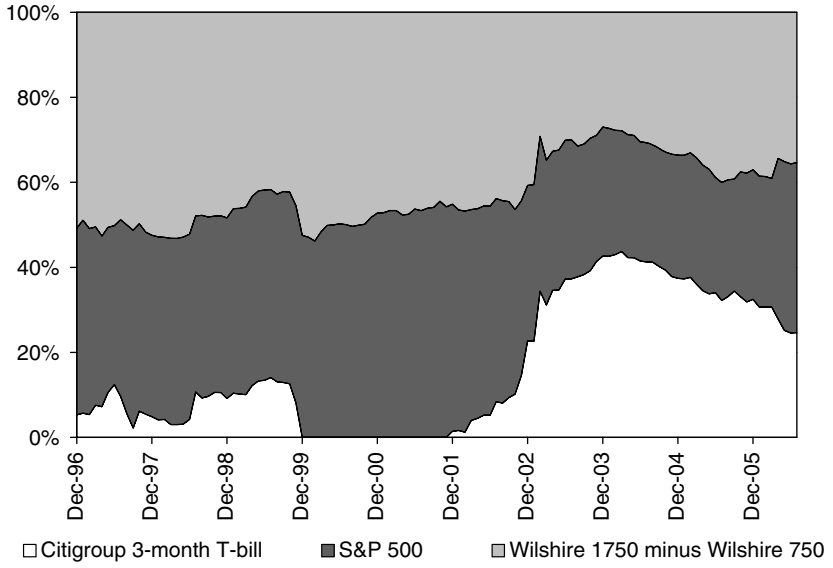

FIGURE 1
Rolling Window of Style Allocations. The computations are performed using StyleAdvisor from Zephyr Associates, Inc.

minus large stocks. Regressing the returns of the HFR Equity Hedge Index on the S&P 500 and the spread between small minus large stocks over the period 1994–2002, they report coefficients of 0.46 for the S&P 500 and 0.44 for the spread, which is measured by the difference of the Wilshire Small Cap 1750 minus the Wilshire Large Cap 750. The R^2 of the regression is 0.77. Figure 1 repeats their analysis using return-based style analysis for a 36-month rolling window and extends the time period beyond 2002.

The style history shows that after the downturn of financial markets in 2000 long/short equity hedge funds substantially reduced their exposure to the stock market, that is, drifted away from their original weights. Given that from month to month 35 observations overlap the change is even more drastic and the gradual shift the mere result of the overlapping windows. The coefficients up to 2002 resemble the ones reported by Fung and Hsieh (2004) and the R^2 over the full time period until July 2006 is 0.76. This example illustrates that even indices may be subject to style drift to some extent. It should be noted that some funds are more difficult to characterize and shifts in the coefficients do not necessarily reflect a significant change in strategy. For these funds the R^2 in a return-based style analysis are likely to be low. Gibson and Gyger (2007) study style consistency using cluster analysis and fuzzy clustering, which attributes managers probabilistically to clusters, instead of return-based style analysis. Unfortunately, any methodology relying on past returns would indicate a style drift ex-post. Unless an investor has access to the hedge fund manager's accounts, it is difficult to detect style drifts in the short run.

Alternative measures that have been proposed to detect style drift are tracking error, style benchmark turnover, and the style drift score. The classical measure to determine

the deviation from a desired benchmark is tracking error. Tracking error is not limited to using a standard benchmark like the S&P 500 but can also be computed relative to a style benchmark. A low tracking error is an indication of a consistent fund. Style benchmark turnover is the change in the weights defining the style benchmark over two subsequent rolling windows (or the cumulative changes over one year). As Idzorek and Bertsch (2004) point out, this measure cannot distinguish a fund that frequently switches between two styles from one that has permanently drifted away from its original investment style. To correct for this shortcoming they propose a new measure named style drift score. Computing the style drift score also requires to first perform a rolling windows analysis. Once the coefficients for each window are determined, we need to compute the variance of the weights for each style factor. The style drift score is defined as the square root of the sum of all these variances.

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Survivorship Bias

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Survivorship bias refers to the bias that is introduced when returns are calculated from a pool of live investment funds only. Funds that die usually do so with poor returns. Since a cohort of live funds includes funds that would eventually die, it is more realistic to calculate historical returns from a pool that includes both live and dead funds. Using only live funds—namely, surviving funds—would produce historical returns that are artificially high.

There are many ways to calculate survivorship bias, the simplest being the difference between the returns of live and dead funds. It is sometimes preferable, however, to calculate survivorship bias using three different portfolios: (1) the surviving portfolio; (2) the observable portfolio; and (3) the complete portfolio. Returns can be raw returns, returns in excess of a benchmark, risk-adjusted returns, or excess returns from a factor model.

Failing to adjust for survivorship bias can lead to returns that are unduly inflated. Most studies of hedge fund survivorship bias, such as those by Liang (2000), Edwards and Caglayan (2001), Amin and Kat (2003), Brown et al. (1999), Capocci and Hubner (2004), and Fung and Hsieh (2000), estimate the bias at two to four percent per year.

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Swap

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A swap is a derivative through which two counterparts exchange one stream of cash flows versus another stream. Each stream is called leg of the swap. In order to compute the absolute value of the payment it is necessary to explicitate a notional amount. The Bank for International Settlements (BIS) publishes statistics on the notional amounts outstanding in the OTC (over-the-counter) Derivatives market every 6 months (see Table 1). At the end of 2006, in case of swaps this was USD 274 trillion (that is around 5.5 times the 2006 gross world product). The majority of this (83, 9%) was due to interest rate swaps. The strongest expansion during the last 2 years is associated with commodity (404%) and Credit Default Swaps (351%).

There are many types of interest rate swap (IRS), but the very basic interest rate swap types are the following ones: (i) fixed *to* float of the same currency; (ii) fixed *to* float of different currencies; (iii) float *to* float of the same currency but between different indexes; (iv) float *to* float between different currencies; and (v) fixed *to* fixed between different currencies.

The valuation of a plain vanilla swap such as a fixed rate for floating rate can be computed from the floating leg, determined at the agreed dates of payments. Since only the actual payment rates of the fixed leg are known in the future, to estimate the floating ones must be used as the forward rates (derived from the term structure). By definition, the present value of the leg is the price of a zero coupon bond with \$1 face value. Thus, analytically, at time t_0 the present value of the floating payments is

$$V_{\mathrm{FL}}(t_0) = \sum_{i=1}^{n} r(t_0, i-1) \cdot B(t_0, i)$$

The first payment is valued $r(t_0, 1)B(t_0, 1)$, the second $r(t_0, 1, 2)B(t_0, 2)$, and so on. The present value of the fixed payments is:

$$V_{\mathrm{FX}}(t_0) = \sum_{i=1}^{n} fB(t_0, i) = f\sum_{i=1}^{n} B(t_0, i)$$

where f is the only indefinite factor; the solution is found by setting $V_{\mathrm{FL}}(t_0) = V_{\mathrm{FX}}(t_0)$ and solving for f. Fixed and floating legs equal, respectively, a fixed income and a floating rate bond. Like the bond, there will be a principal reimbursement at time n. Thus, it is possible to price the two bonds as follows:

$$V_{\mathrm{FXRB}}(t_0) = f\sum_{i=1}^{n} B(t_0, i) + B(t_0, n)$$

for the fixed bond, and

$$V_{\mathrm{FLRB}}(t_0) = \sum_{i=1}^{n} r(t_0, i-1, i) \cdot B(t_0, i) + B(t_0, n)$$

for the floating one.

TABLE 1

Amounts Outstanding of Over-the-Counter (OTC) Swaps by Risk Category (In Billions of US Dollars)

	Notional Amounts Outstanding					Gross Market Values				
	Dec 2004	Jun 2005	Dec 2005	Jun 2006	Dec 2006	Dec 2004	Jun 2005	Dec 2005	Jun 2006	Dec 2006
Currency swaps	8,223	8,236	8,504	9,669	10,772	745	549	453	533	599
Interest rate swaps	150,631	163,749	169,106	207,042	229,780	4,903	6,077	4,778	4,831	4,166
Equity linked*	756	1,086	1,177	1,430	1,764	76	88	112	147	165
Commodity*	558	1,748	1,909	2,188	2,813	—	—	—	—	—
Credit default swaps	6,396	10,211	13,908	20,352	28,838	133	188	243	294	470
Total swaps	166,564	185,030	194,604	240,681	273,967	5,857	6,902	5,586	5,805	5,400

* Statistics merge forward and swap contracts.

Source: Bank of International Settlements, Semiannual OTC derivatives statistics at end-December 2006, May 2007.

In an efficient market, the net present value of the fixed leg must be on par to the net present value of the floating leg. This constraint ensures liquidity to the swap market. Since at t_0, the price of the floating rate bond must be 1, the solution for the swap fixed rate can be found solving for f.

$$1 = f\sum_{i=1}^{n} B(t_0, i) + B(t_0, n)$$

Thus,

$$f = \frac{1 - B(t_0, n)}{\sum_{i=1}^{n} B(t_0, i)}$$

which is equivalent to finding the fixed rate on a par value fixed rate bond.

The forex exchange (or currency) swap is an agreement to trade two currencies at the initial date and to rearrange the cash flow at the final date. This contract is comparable to borrow in one currency and lend in another.

To find out how to price the forex exchange swap, let us imagine borrowing US dollars and lending euros. Both the flows would be fixed. The price of the US dollar leg is

$$V_{\text{USD}}(t_0) = f_{\text{USD}} \sum_{i=1}^{n} B_{\text{USD}}(t_0, i)$$

while the present value of the euro leg is

$$V_{\text{EURO}}(t_0) = f_{\text{EURO}} \sum_{i=1}^{n} B_{\text{EURO}}(t_0, i)$$

To compare these two vectors, we need to multiply V_{EURO} by the exchange rate $\$€(t_0)$ times the Euro notional principal, $N_€$. In other words, we have $N_€\$€(t_0)V_{\text{EURO}}(t_0) = V_\$(t_0)$, and the solution is found by solving for the one unknown $N_€$.

A credit default swap (CDS) is a bilateral contract under which two counterparties

concur to isolate and independently trade the credit risk of a third actor. CDSs are usually issued in order to hedge (or speculate) events like defaults, failure to pay, insolvency, liquidation, or restructuring. The settlement of this contract is physical. As a result of this, a triggering event obliges the protection seller to pay the face value of the "reference obligation" against the protection buyer's obligation to deliver the protected balance due.

There are two competing theories usually advanced for the pricing of credit default swaps:

a. the probability model, which takes the present value of a series of cashflows weighted by their probability of nondefault. This method suggests that credit default swaps should trade at a considerably lower spread than corporate bonds (Elton et al., 2001);
b. the nonarbitrage model, which prices the CDS by means of four factors: (1) the issue premium; (2) the recovery rate; (3) the credit curve for the reference entity; and (4) the LIBOR (London Interbank Offered Rate) curve (Duffie and Singleton, 2003; Hull and White, 2000).

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Sweat Equity

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Sweat equity refers to the value added by entrepreneurs in a new venture through their unpaid labor. It reflects the value created by the owners of a company as a result of the time, talent, and effort they contribute. The term "sweat equity" refers, in general, to the noncash contribution of an entrepreneur without a link to accounting. However, in some countries entrepreneurs are able to account for their sweat equity in their balance sheet. Entrepreneurs can then receive additional share of ownership for their added value. In contrast to sweat equity, financial equity refers to the monetary contribution to a company by its owners.

In the context of a venture capital financing round the sweat equity of the entrepreneur may lead to conflicts in negotiating the deal. The entrepreneur and the venture capital investor are likely to have conflicting perspectives on the share of ownership the entrepreneur should keep due to his noncash contributions. The entrepreneur expects to be compensated for the sweat equity he has contributed in the past. In contrast, venture capital investors base the venture valuation purely on the future growth potential. For them, it is relevant whether the past efforts of the entrepreneur result in a basis for future profits that would enable them to realize a successful exit. Only then they would be willing to compensate the entrepreneur for his past efforts. Ineffective

or irrelevant contributions by the entrepreneur can be considered sunk costs for the entrepreneur.

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Syndicate

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Syndicate is a group of venture capitalists, private equity investors, underwriters, and so on, who temporarily work together on one project. A syndicate is led by the lead investor (lead underwriter, lead venture capitalist, etc.).

Syndicate Bid

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The "syndicate bid" describes two prices. The first definition of the term refers to a climate of competition between various syndicates. It describes the price a syndicate consisting of different (investment) banks offers to the issuer of a security. In order to win the deal each syndicate might choose a high bid, but also faces the risk of not being able to place the issue in the market in case of an overpricing. During the so-called "price meetings," which take place before announcing their syndicate bid the members of an underwriting syndicate try to reach consensus about bid and offer prices. After winning the deal, the corresponding syndicate starts selling the issue at the agreed offer price. As soon as the syndicate is dissolved each underwriter is allowed to sell at an arbitrary price (Logue, 1988). In this context, the syndicate may also be formed by two or more venture capitalists or buyout companies, which jointly try to acquire a target company. Therefore, the syndicate bid is the price the syndicate is willing to pay for their target (Lerner, 2000).

The second price described by the term "syndicate bid" refers to the single price of a security agreed upon by the syndicate members. In this context, the Securities and Exchange Commission (SEC) allows the syndicate manager and all other syndicate members to stabilize the market by increasing the demand of the issued security (mostly shares in an IPO) during the offering period. This activity aims at keeping the price stable, which is of importance, especially during periods of rather weak demand. Under Regulation M of the Securities Act of 1934, stabilization is allowed as an appropriate mechanism in order to distribute securities. Further legal sources governing stabilization in the United States can be found in Regulation K, Rule 104, which replaced Rule 10b-7 (Corwin et al., 2004).

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Syndicate Manager

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Syndicates of at least two different entities have the function to diversify risks among their members. Quite often they consist of investment banks or venture capitalist and buyout companies, respectively. In public offerings of securities the investment banks face, for example, underwriting risks.

Historically, relative to total risk, their capital accounts were very small, which led to one of the earliest syndicated underwritings—Pennsylvania Railroad in 1870 (Lerner, 1994). Another reason for forming syndicates is the combined distribution capability of all members. Banks of different sizes and different expertise organized in syndicates can draw upon their combined knowhow. Due to different strengths and weaknesses of each participant most often they have different functions within the syndicate, which might bring to mind a "pyramid structure": The syndicate manager is placed on top—he is also referred to as lead underwriter, managing underwriter, or lead manager. In the area of venture capital and private equity, the term "lead investor" is encountered most often.

The syndicate manager organizes the syndicate itself as well as the issuance of bonds and securities. For this purpose, he has to find further underwriters and organizations and invite them to form a syndicate. The syndicate manager negotiates terms and conditions as well as pricing questions within the syndicate and, as spokesman of the syndicate, with the issuer. Furthermore, he has to assess. In accordance with the other syndicate members, the syndicate manager executes stabilizing transactions during the offering period. Some syndicates may have several syndicate managers. Together they form a so-called management group in which the above-mentioned management functions are split up and coordinated. The decision for or against implementing a management group depends on the security type of the issuance, possible relationships between issuer and investment banks, and the perceived abilities of the corresponding banks. Usually, one bank of the management team is lead manager or book-runner. The remaining nonmanaging banks of the syndicate are also hierarchically placed structures, starting with the bulge bracket, followed by the major bracket, and finally by the submajor bracket. Between major and submajor bracket a mezzanine bracket may be found (Freeman and Jachym, 1988).

The syndication of venture capital or buyout investments in privately held companies differs from public offerings of stocks (Blumenthal, 1993). The Securities and Exchange Commission (SEC) does but slightly regulate the manner in which shares are sold from private companies to venture capitalists and buyout funds. This fact facilitates cooperation between investment companies. Furthermore, the venture capitalists and buyout funds invest forthright into their target companies and are willing to hold their investments for several years, and they are even obliged to do so for a period of more than 2 years. Since usually the asymmetric information

between investors and target companies is by far higher in venture capital and buyout funds than in public offerings, the investment decision is more complex. Syndication is one mechanism to reduce lacking information about potential target companies (Lerner, 1994). The conduct of negotiations, especially prior to first-round financings as well as in the following rounds, is one of the lead investor's exclusive tasks. Furthermore, the organization of funding is part of the lead investor's business. He is also responsible for continuous monitoring combined with hands-on assistance with respect to all business matters of the portfolio company (Sapienza et al., 1996).

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Syndicated Sale

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A syndicated sale refers to two types of transactions. In the field of venture capital and buyout, it describes the joint acquisition of a portfolio company by a syndicate of at least two investors under guidance of one lead investor. Sometimes, this kind of transaction is also referred to as coinvestment. This approach is characterized by the joint action of the participants who face tremendous information uncertainties, that is, the investment decision is reached unanimously and the venture capitalists or buyout firms are united by the common purpose to increase their portfolio company's value (Bruining et al., 2006).

In the context of investment banking, a syndicated sale describes a transaction in which a bank underwrites the issuance of a specified security and passes parts of these securities to the other syndicate participants in order to sell them at a previously negotiated single price. Sometimes, there are also banks involved, which are not part of the syndicate; they form the selling group. The syndicated sale allows the involved investment banks to share their risks. All syndicate participants and members of the selling group are compensated for selling securities to the final investors, the so-called spread between the price paid by the investors, and the price paid to the issuer of the security. The syndicate manager, potential further managers, syndicate participants, and the members of the selling group share this spread because of their readiness put up with risks and distribute the securities to the investors. Generally, the syndicate manager and the other managers receive an additional compensation for executing their management function and coordinating the syndicate and, in the case of the book-running manager, for the technical efforts (Freeman and Jachym, 1988).

Three forms of contracts are used in an underwriting. In a "firm-commitment" contract, the underwriter guarantees the issuer the sale of the securities at a price negotiated beforehand, and the risk is borne by the

underwriter. The "best-efforts" contract is the agreement in which the underwriter commits himself to sell at the negotiated price as many of the securities as possible, whereas in the "all-or-none" contract the underwriter sells either the whole issuance or exercises his right to cancel the transaction (Logue, 1988).

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Syndication

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Syndication is a joint investment of several investors in one company. Syndicated deals are common in venture capital or private equity industries (Lerner, 1994). There are several reasons for which investors syndicate their deals. First, syndication improves the portfolio diversification and risk sharing of the investors as each of the investors can, with a limited amount of resources, participate in more projects. Second, information sharing may be another reason for cooperation among investors. Syndication may already be important during the selection process because a syndicate of investors may reduce the asymmetries of information more efficiently and be able to select the best quality projects better than a single investor. In practice, the decision to put money into a project is often made conditional upon the finding of another partner who is willing to cofinance the firm. Third, multiple investors may generate a higher value added for their portfolio firms compared to deals financed by a single investor (stand alone deals). Multiple investors may offer an improved managerial support for their portfolio firms through their complementary skills and through a larger variety of contacts than a single investor. Fourth, syndication may be a means of mitigating competition. Instead of competing for deals, the investors cooperate. Fifth, when reciprocity works properly, syndication can be a means of assuring deal flow. Sixth, investors may learn from each other during the investment process.

However, syndication also incurs costs. The single investor has to take into account that—when he decides to syndicate a deal—he would have to share the profits with his partners. For this reason, experienced investors who would not profit a great deal from information sharing, value adding, and learning from their potential partners may not be willing to syndicate their best deals. Moreover, some agency problems may be aggravated in syndicated deals compared to stand-alone deals because more participants with different preferences and information sets are involved. However, reputational mechanisms, repeated relationships, and reciprocity are expected to diminish potential agency conflicts among the syndicate partners.

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Systematic CTA

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A systematic commodity trading advisor (CTA) trades futures contracts according to a computer-generated pricing model. Many CTAs are trend followers, who strive to take long positions in upward trending markets and short positions in downward trending markets. A CTA may trade in a wide variety of markets worldwide, perhaps following over 150 futures contracts in agricultural, energy, precious and industrial metals, bonds and interest rates, and currencies and stock index futures. CTAs are subject to the regulation of the Commodity Futures Trading Commission (CFTC).

The profits generated by a systematic CTA are largely earned in the markets with the largest and most steady trends. A volatile, nontrending market would cause losses for systematic CTAs, who have solely implemented trend following models. Some CTAs may choose to mix trend following and counter-trend models, which bet on mean reversion rather than trends. This diversification between trend following and counter-trend models allows the CTA to produce more consistent profits, especially in times of volatile, range-bound markets characterized by large price movements in both directions. Systematic traders are trained to understand that the largest profits come from sticking with a very long-term trend. This tendency can lead to volatile performance, with large drawdowns often following the largest gains, as long-lasting trends may reverse.

Systematic CTAs are often called technical traders as many fund managers simply focus on volume, volatility, and price formations. An example of a simple technical analysis rule is a moving average crossover system, where the trader takes a long position when a short-term (perhaps 5 day) moving average crosses above a long-term (perhaps 30 day) moving average. A short position is initiated when the short moving average crosses below the long-term moving average. Ideally, all trading models are thoroughly tested before implementation, as discretionary trades are often less successful than the systematic trades, especially when that discretion leads the trader not to implement the trades requested by the system. Many systematic CTAs trade a variety of models—each optimized for a different market condition. Perhaps a CTA may have four models including those that perform well in high- and low-volatility trending markets, and others that profit in high- and low-volatility trendless markets. Most systematic CTAs do not attempt to quantify the fundamentals of futures markets such as the supply and the demand factors facing commodities, or how interest rate or inflation expectations may impact currency or bond markets.

The funds offered by CTAs are often called managed futures funds. These funds tend to have excellent diversification characteristics when added to an equity portfolio, as the largest gains to managed futures funds often come during the time when equity markets are posting their largest losses. Systematic CTAs typically have return profiles that have a very low, or even a negative, correlation to traditional long stock and bond market indices. Funds that trade a wide variety of markets, including commodities, are more diversifying to a portfolio of traditional investments while CTAs that solely trade financial futures are less diversifying.

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Systematic Trading

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Systematic trading is an investing discipline that involves quantitative research and technical market data. An analyst inputs the market conditions into a software application that would initiate a trade program once certain market conditions or parameters are met. An example of a parameter would be if two moving averages cross each other, it would indicate a technical signal to initiate the trades. The trade programs are based on a set of well-defined rules that tells you when and what to buy or sell. There are various software vendors with special applications that monitor technical market data and alert the analyst or kick off these trade programs automatically. Proponents of this type of analysis believe that historical market conditions repeat over time; therefore, they trade on these conditions.

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Synthetic Future

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In a complete financial market any asset can be replicated by using a suitable portfolio (i.e., linear combination) of other assets (Björk, 1998). Here, I would show how to replicate a forward/future contract by using three different approaches. If an investor goes long at time t on a forward contract expiring in T, he engages to pay in T a given amount of money (F_T) and receive a given amount of the underling asset (whose value will be $S(T)$). Accordingly, the investor's payoff in T would exactly be $S(T) - F_T$ and, at any time t, the value of the forward contract $F(t, T)$ would be given by (Hull, 2005):

$$F(t,T) = \mathsf{E}_t^Q\left[(S(T) - F_T)\frac{G(t)}{G(T)}\right]$$

where E_t^Q is the expected value operator under the risk neutral probability (Q) and given all the information at time t, and $G(t)$ is the value in t of a riskless asset (accordingly the ratio $G(t)/G(T)$ is the discount factor between t and T). An easy simplification allows us to write:

$$\begin{aligned} F(t,T) &= \mathsf{E}_t^Q\left[S(T)\frac{G(t)}{G(T)}\right] - F_T\mathsf{E}_t^Q\left[\frac{G(t)}{G(T)}\right] \\ &= S(t) - F_T B(t,T) \end{aligned} \quad (1)$$

Here, we have used the following properties: under the probability Q, (i) the discounted value of any risky asset is a martingale; and (ii) the expected value of the

discount factor coincides with the value of a zerocoupon $B(t, T)$.

This allows us to conclude that a forward contract is replicated by going long on one underling asset and going short on F_T zerocoupon (i.e., borrowing an amount of money F_T). The replicating portfolio (also called synthetic forward) can also be obtained as described in Table 1.

Since the strategies A (buy a forward) and B (buy an underlying and borrowing F_T) have the very same payoff in T, their value must equate also in t (if this were not true, then on the financial market there would be an arbitrage opportunity). Accordingly, we find another time Equation (1), which also allows us to find the suitable price F_T for a forward contract knowing that when it is issued (let us say in t_0) its value $F(t_0, T)$ must be zero. Accordingly, we have:

$$F_T = \frac{S(t_0)}{B(t_0, T)}$$

The price of a forward can also be replicated by using vanilla options. A European call option with strike price F_T has value:

$$C(F_T, T) = \mathsf{E}_t^Q \left[(S(T) - F_T) \frac{G(t)}{G(T)} \, |_{S(T)>F_T} \right]$$

where $I_{S(T)} > F_T$ is the indicator function of the event $S(T) > F_T$ whose value is either 0

TABLE 1

The Replication Portfolio

Strategy	Cash Flow in t	Cash Flow in T
A. Buy a forward	$-F(t, T)$	$S(T) - F_T$
B. Portfolio:		
Buy one underlying	$-S(t)$	$S(T)$
Borrowing the present value of F_T	$F_T B(t, T)$	$-F_T$
Portfolio value	$-S(t) + F_T B(t, T)$	$S(T) - F_T$

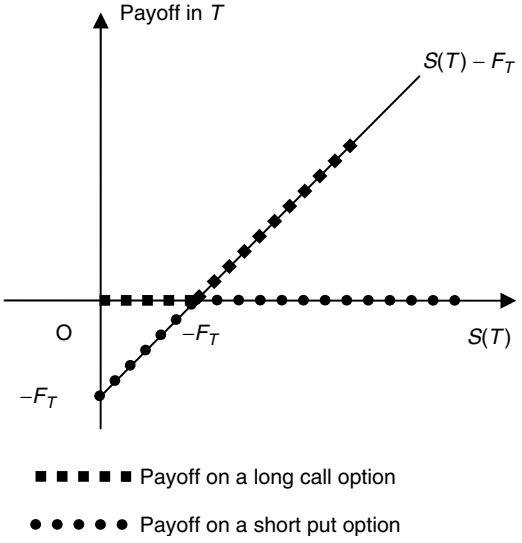

FIGURE 1

Replicating a forward by two European options.

if the event does not happen or 1 if the event happens. The value of a European put option with strike price F_T is:

$$P(F_T, T) = \mathsf{E}_t^Q \left[(F_T - S(T)) \frac{G(t)}{G(T)} |_{S(T)<F_T} \right]$$

Accordingly, it is easy to show that a portfolio with a long position on $C(F_T, T)$ and a short position on $P(F_T, T)$ replicates the forward contract:

$$C(F_T,T) - P(F_T,T) = F(t,T) \qquad (2)$$

The comparison between Equations (1) and (2) gives the so-called put-call parity. This synthetic forward can be graphically represented as in the Figure 1, where the payoffs in T of the forward and the options are represented.

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T

Takedown

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Takedown is referred to in the case of security issuance and payments into a venture capital or private equity fund. In the first complex, one meaning of takedown is the price underwriters pay the issuer for a specific security that afterwards is offered to the investors. In this context, takedown might also describe the commission the (investment) bank keeps for the various services offered by the different banks, for example, managing the syndicate, taking risk, arranging the security issuance, and distributing the securities to the public. As already mentioned, the compensation between the banks differs. The lead manager may approximately receive 15–20%, and the underwriters between 50 and 75% of the total compensation for an underwriting. If the lead manager is also an underwriter (as is usually the case), and belongs to the selling group, he participates in all revenue segments of a syndicate (Logue, 1988).

The second meaning of takedown related to security issuance is the proportion (absolute amount) or quota (percentage) of the security a (investment) bank is going to distribute in a syndicated sale or an IPO (Achleitner, 2002). Furthermore, it refers to a "takedown transaction" if, during the first trading day of a new security, an underwriter or syndicate manager sells transaction securities below the list offering price in a primary market sale.

Takedown is also relevant in the context of managing venture capital and private equity funds. Here takedown is the amount of money an investor transfers to the fund. To find attractive target companies and to concentrate on only a few deals at a time, the fund managers refrain from collecting all the money the investors promised to invest into the fund, the so-called committed capital, at one point in time. Another reason for not paying all the funds prematurely is that the interest paid by the bank is significantly lower than the rate of return the investments of the fund are expected to achieve. The partnership agreements, which the limited and the general partners enter into, usually contain a takedown schedule as a specification of the way and the timing the funds are paid in. Typically, an initial

payment (set amount) of up to 33% of the committed capital is arranged. For the subsequent payments either fixed dates for the takedowns are set in the agreement or are left to the discretion of the general partner. In the latter case, a minimum and a maximum time period is fixed. One year, or at the latest 3 years, after a fund's inception all funds are drawn from the limited partners (Lerner, 2000).

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Technical Analysis

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Technical analysis uses market-generated data to create and design technical indicators through which market trends are foreseen and recurring stock price patterns are detected. The primary aim of the technical analysis is to make timely trading (buy/sell) decisions relying on technical indicators.

Technical analysis can be applied with ease without having recourse to cumbersome estimating procedures and calculations, as in fundamental analysis. In valuing stocks, the technical analysts argue that the inputs required by fundamental analysis are not practical. That is, all these inputs are already embedded in the market price of the security. Within the conceptual framework of the technical analysis, any data generated by the market can freely be utilized in the analysis provided they serve (or are believed to serve) to fulfill the aim of forecasting stock prices accurately. These data are in quantitative and qualitative nature, which range from concrete ones as movements of stock prices, volume of trading to such obscure measures as the greet-fear cycles, and the herd instinct.

Basic assumptions of technical analysis can be listed as follows (Murphy, 1999):

- The interactions of demand and supply determine market value.
- Numerous rational and irrational factors influence demand and supply. These factors are appraised immediately and continually in the market.
- Stock prices fluctuate in trends that last for a considerable time. However, if there are minor fluctuations in the market during this time, they should be disregarded.
- The shifts in the supply and demand cause changes in trends. The analysts eventually detect these shifts.
- Shifts in supply and demand can be detected in the charts.
- Some chart patterns that repeat themselves are meaningful indicators. They can be used to identify favorable market timing for making buy/sell decisions.

The major steps required to perform technical analysis can be summarized as follows:

1. Gathering and recording data generated by the market.
2. Creating indicators. The market data can be analyzed in almost an

infinite variety of ways by creating technical indicators to detect patterns (Lo et al., 2000). New indicators are created while some existing ones are retired. An indicator can be used as long as it is believed that it tracks the market conditions well.

3. Interpreting the patterns to forecast future movements of stock prices and/or to predict a change in the direction of the market. These interpretations are subjective in nature.

A TECHNICAL ANALYSIS APPROACH: DOW THEORY

Dow theory is one of the oldest and most widely followed technical approaches to the stock market. It is based on the movements of the Dow Jones Industrial Average and the Dow Jones Transportation Average. Dow theory divides the movements of the market into three major groups:

1. *Primary movement*: It reflects the long-term direction of the market. Determination of this movement as bullish or bearish is the basic objective.
2. *Secondary movement*: The secondary trend, also named as corrections, is shorter in duration. It shows the departures from the primary movement.
3. *Daily fluctuations*: These are meaningless daily movements, perceived as noise.

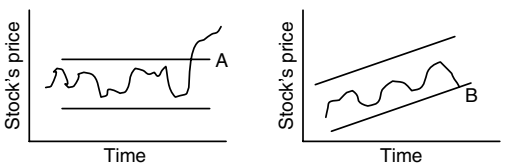
It should be pointed out that forecasts are based on primary and secondary movements. Dow theory is generally accepted as a dependable barometer to determine where the market is and where it is heading (not how far or high). Within the conceptual framework, it is suggested that (a) there is an upward market if the cyclical movements of the market averages increase over time and the successive market lows become higher; (b) there is a downward market if the successive highs and lows in the market are lower than previous highs and lows.

BASICS OF TECHNICAL ANALYSIS

Support and Resistance Levels

Support and resistance levels are the lines indicating an individual stock's (or the market's) trading range, which are also considered to be psychological barriers. The support level is the lower end and the resistance level is the upper end of the trading range. It is suggested that as long as the market price of a particular stock remains within the trading range, the investor does not have to make a trade decision since there exists no substantial benefit in buying or selling that particular stock.

However, when the market price is higher than the resistance level (point A) or lower than the support level (point B), as shown in the following graphs, there exists a profitable trading possibility (i.e., a buying position at point A and a selling position at point B exist). The reason is that the stock will be trading in a new range, heading to new highs after point A and to new lows after point B.



Charts

Technical analysts use charts as a major tool for analysis; hence, they are also named as chartists. There are mainly four charting techniques available as follows (Murphy, 1999): (i) relative strength charts, (ii) moving average (simple moving average, weighted moving average, and exponential moving average) charts, (iii) hi-lo-close and candlestick charts, and (iv) point and figure charts. Once a chart is drawn, the technical analyst investigates it to find a repeating pattern in order that the market direction can be forecasted.

Momentum and Contrarian Strategies

Momentum and contrarian strategies aim to profit by buying stocks that have recently been winners and losers, respectively. Momentum strategies are based on the argument that the winners will continue to be winners, whereas the contrarian strategies are based on the argument that losers will be winners in the future. Proponents of efficient markets hypothesis argue that if markets are efficient, these strategies should not work. However, there exists empirical evidence supporting the profitable opportunities provided by these strategies as De Bondt and Thaler (1985), Chan et al. (1996), Dreman (1998), and Pan and Hsueh (2007) suggest. In contrast, Fama (1998) states that these strategies are based on apparent anomalies, which are methodological illusions.

Behavioral finance studies the consistent departures from rational behavior that cause these anomalies in the markets. These form the patterns that are sought and utilized by technical analysts. Numerous studies in the literature provide empirical evidence and arguments on the usefulness of technical analysis.

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Tender Offer

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A potential purchaser of a large number of shares in a company can put a request to all shareholders to determine those willing to offer their shares for purchase. Such a request to purchase shares from a large number of investors is a tender offer. A tender offer may be used by a company to repurchase some of its shares as a way of returning cash to shareholders (Comment and Jarrell, 1991). A tender offer by a company to repurchase some of its shares would specify the number of shares to be bought and when the offer would expire. The same price will be paid for all shares acquired in a tender offer. This compares with the company buying back shares in an open market repurchase where sellers would

received different prices based on when the transaction occurred on the stock market. A tender offer may also be used by an outside investor or company to acquire a large proportion or a controlling interest in another company. In acquisitions, a tender offer is usually used to acquire enough voting control to enable the takeover to succeed. Tender offers made for the purpose of acquisitions would normally pay a premium over the prevailing price on the stock market. As a method of achieving a business combination, when a tender offer is used in a hostile acquisition, there is empirical evidence that there are long-term wealth gains for acquiring company shareholders compared to friendly mergers (Dodd and Ruback, 1977).

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Term Sheet

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In venture capital investing, a term sheet refers to a letter written by an investor, typically a venture capital firm, to a start-up company outlining the basic terms of the investment agreement. These financial terms would include the investment amount, the stake to be taken up by the investor, and the implied pre-money valuation and post-money valuation for the investor. Other terms include preemptive rights by the investor to invest in future rounds or to acquire additional stakes if some of the existing investors decide to sell their shares in the company, antidilution and rachet provisions to protect the investment value of the investor, as well as the rights of the investor in such matters as hiring of senior people in the company, representation at the company board, and consent before the company can file for public listing or sell the company.

Once the term sheet is agreed upon by both the investor and the company, the investment agreements are then prepared in accordance to the agreed terms; although if market conditions change and/or one or both parties change their mind, the terms may be amended before the legal documents are entered into.

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Third-Stage Financing

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At this stage, the firm is experiencing success in terms of sales, with clientele purchasing the product. At the third stage, capital

for financing operations is used to expand or increase the existing plant capacity, fine tune marketing, as well as increase the quality of the product via product improvements. Capital is now provided for firm expansion to meet the growing demand for the product because the firm, at this stage, is closing in on its break-even point and beginning to show signs of some profitability.

Tick

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Tick is the smallest possible movement, up or down, in the price of a financial asset. Until the end of the 1990s, the system used in the United States to determine the tick was through the use of fractions of 1/8, which was most likely introduced from the traditional predecimal division of the British pound into quarters and eighths. Currently, the shares negotiated on the New York Stock Exchange are negotiated with movements of $0.01 instead of the system using fractions. In some countries, the size of the tick is determined on the basis of the price level of the share, although the common way is a single value for all the securities negotiated. Although the size of the tick in a market may be nominally fixed, a company can influence the percentage of the price of its securities that it represents, modifying the number of securities negotiated by means of splits or share repurchases (Angel, 1997). In this method, the obligatory size of the ticks can describe a major percentage of variation in the prices of the securities between the different markets. In the specific case of the adoption of the decimal system in the United States, Dyl et al. (2002) found that it led to lower prices (due to the splits) for the securities, without this leading to a substantial change in the volume negotiated in monetary terms.

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Time Value

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Time value of an option is part of an option premium paid by the option buyer to the option seller. The premium paid by the buyer to the seller of an option can be divided into two components: the intrinsic value and the time value.

The time value (TV) of a call option (C) at time t is given by:

$$\mathrm{TV}_{\mathrm{C},t} = C_t - \mathrm{IV}_{\mathrm{C},t} = C_t - \max[0; S_t - K] \tag{1}$$

where $\mathrm{IV}_{\mathrm{C},t}$ stands for the call option intrinsic value at time t, S_t represents the underlying asset price at time t, and K stands for the exercise price of the option.

Similarly, the time value of a put option (P) at time t is given by:

$$\mathrm{TV}_{\mathrm{P},t} = P_t - \mathrm{IV}_{\mathrm{P},t} = P_t - \max[0; K - S_t] \tag{2}$$

Options before maturity tend to have a positive time value, since time has not elapsed until maturity. At maturity the time value is zero because there is no time left to value the option. At maturity the value of an option coincides with its intrinsic value. American options (that can be exercised at any moment in time until maturity) have a positive or null time value until maturity. If at any moment in time the time value of an option is zero, this means that the option should be exercised immediately at that moment. Therefore, the time value of an American option can never be negative. As a consequence, the premium of an American option is always greater than its intrinsic value.

For European options, however, particularly for deep in-the-money put options, or for calls just prior to the underlying stock paying dividends or yielding other cash inflows, it is conceivable that time value can be negative. Let us take a deep in-the-money European put option and its corresponding American put. If the underlying asset is too low related to the strike price, it is worth more to exercise the option before maturity. Otherwise the probability of an upside move of the underlying asset price could hurt the profits of the deep in-the-money put position. But as European put options could not be exercised earlier, holding European options with time to maturity can be negative, compared to other corresponding European options with shorter maturities.

European call options on underlying stocks paying cash dividends or other cash inflows can also have negative time value. If the amount lost by destroying time value is less than the amount gained by holding the underlying asset, it would be preferable to exercise the options prior to the ex-dividend date, if this was possible. However, as European options cannot be exercised before maturity, holding European options can be penalizing, compared to the corresponding American options. In these circumstances, the time value is negative for European options. For example, IBM shares are presently trading at \$113.37. American call and put options with maturity within 60 days are trading for several strike prices. Quotes for calls and puts follow: $K = \$110$, $C = \$6.10$, $P = \$2.60$; $K = \$115$, $C = \$3.10$, $P = \$4.70$.

The TV for each series, applying Equations 1 and 2, is:

Strike	Calls (\$)	Puts (\$)
$K = \$110$	2.73	2.60
$K = \$115$	3.10	3.07

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To-Arrive Contract

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A to-arrive contract is the first known futures-type contract that was developed in the middle of the nineteenth century at the Chicago Board of Trade (CBOT). The CBOT was established to bring farmers and merchants together and to standardize the quantities and qualities of the traded grains (see Hull, 2007). These standardized contracts are called to-arrive contracts. It allows the farmer to sell the grain for a

fixed price, the so-called futures price, and to deliver the grain to a specified futures date. For example, a wheat farmer expects to have 100,000 bushels of wheat to sell in 4 months. The price of wheat is volatile so there is a price risk. To hedge this risk the farmer can agree to deliver the bushels of wheat in 4 months at a price that is set today. The definition "to-arrive" is referred to the delivery of the traded commodity. In the nineteenth century and earlier, a lot of goods were brought by ship. The price, quantity, and quality of the commodity were fixed before delivery. The main part of trading, that is, delivery and payment, took place when the ship arrived in the harbor. This type of contract is still used today, but not as much as it was in the past.

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Tombstone

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A tombstone is an advertisement in newspapers and other publications that is used by financial firms to announce significant underwriting, fundraising, or personnel developments. For example, investment banks will use tombstones to announce a public offering of securities that have successfully completed the underwriting process. Investment banks will also take out tombstone advertisements to announce a private placement of securities for a particular client or to highlight their role in a strategic transaction such as a corporate merger or acquisition (Downes, 2003). Private equity firms will place a tombstone to announce the launch of a new fund or to notify of a significant closing. Financial firms will sometimes use a tombstone to announce a significant personnel change.

Tombstones are most commonly used to announce newly registered securities by an investment banking firm. In this instance, the tombstone will contain details about the issue including the name of the issuing company, the security type, the offering price, the total value of the offering, and the names of the investment bankers associated with the deal. In addition, there is an established protocol to the format of this type of tombstone. Specifically, there is a particular order in which the investment bankers are listed in the tombstone. Listed at the top are the lead and colead investment banks for the issue. They are followed by the "major bracket" investment banks, an industry-determined categorization that is based upon reputation and national focus. Next in line are the "mezzanine bracket" investment banks, which are typically smaller firms that operate nationally. Finally, at the bottom of the list are the regional investment banks (Damadoran, 2004).

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Top-Down Investing

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Top-down investing targets investment opportunities along with a three-step selection process based on a macroeconomic analysis (e.g., strategic or tactical asset allocation). First, the impact of the business cycle and financial market conditions are assessed across major asset classes (i.e., equities, fixed-income securities such as bonds, money market assets, and currencies). This analysis level is achieved in the light of geography, region, and country dimensions while considering leading economic fundamentals (e.g., GDP, interest rates, production, market indexes, consumer anticipations, inflation, and employment). Second, once the most interesting market place(s) is(are) selected, related sectors are classified according to their attractiveness and competitiveness. Winning sectors are identified as industries exhibiting the best return prospects. Third, the most attractive securities are selected within the most competitive sector(s) on an individual basis (expected outperforming securities). For this purpose, issuing companies are analyzed in the light of corresponding firm-specific fundamentals. For example, stock-based top-down investing attempts to select expected outperforming stocks in the light of issuers' size (e.g., small caps) and related style (e.g., value or growth stocks). Finally, top-down investing allows for portfolio diversification across leading financial markets all over the world and across related winning sectors.

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Tracking Error

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Tracking error may be defined as the error related to the tracking of a stock index, that is $(R_p - R_b)$, where R_p is the return of a portfolio and R_b the return of a benchmark. But the tracking error is also often defined as the volatility of $(R_p - R_b)$, computed over a period. A popular model of tracking error is the Roll's one (1992). In this model, a portfolio manager searches for a given spread over a benchmark but he wants to minimize the tracking error defined in this case as the volatility of the spread. This model is written as follows: The tracking error is equal to $\boldsymbol{x}^T\boldsymbol{V}\boldsymbol{x} = (\boldsymbol{q}_p - \boldsymbol{q}_b)^T\boldsymbol{V}(\boldsymbol{q}_p - \boldsymbol{q}_b)$, where $\boldsymbol{q}_p$ is the vector of the portfolio weights, $\boldsymbol{q}_b$ the vector of benchmark weights, and V the variance–covariance matrix of the stock returns. The portfolio manager minimizes this variance under the following two constraints: The expected spread here is denoted by $\boldsymbol{G}$, defined as $\boldsymbol{x}^T\boldsymbol{R} = \boldsymbol{G}$, with $\boldsymbol{R}$ the vector of stock expected returns and $\boldsymbol{x}$ the vector of weights changes. The second constraint is $\boldsymbol{x}^T\boldsymbol{1} = 0$, that is the vector $\boldsymbol{x}$ is orthogonal to the unitary vector. In terms of the arbitrage theory, an arbitrage portfolio must

be self-financing. To find a solution to this problem, we must formulate the Lagrangian function as follows: $\boldsymbol{x}^T\boldsymbol{V}\boldsymbol{x} + \lambda_1[\boldsymbol{G} - \boldsymbol{x}^T\boldsymbol{R}] + \lambda_2[0 - \boldsymbol{x}^T\mathbf{1}]$. By computing the usual derivatives of this function with respect to the unknowns, we obtain the optimal $\boldsymbol{x}$, which is given by

$$\boldsymbol{x} = \boldsymbol{V}^{-1}\begin{bmatrix}\boldsymbol{R} & \mathbf{1}\end{bmatrix}\boldsymbol{A}^{-1}\begin{bmatrix}\boldsymbol{G}\\ 0\end{bmatrix}$$

with

$$\boldsymbol{A} = \begin{bmatrix}\boldsymbol{R}^T\boldsymbol{V}^{-1}\boldsymbol{R} & \boldsymbol{R}^T\boldsymbol{V}^{-1}\mathbf{1}\\ \boldsymbol{R}^T\boldsymbol{V}^{-1}\mathbf{1} & \mathbf{1}^T\boldsymbol{V}^{-1}\mathbf{1}\end{bmatrix}$$

Let us note that the solution is very sensitive, as usual, to the forecasted returns and to the variance–covariance matrix $\boldsymbol{V}$. This static tracking model might be improved by resorting to higher moment returns (i.e., skewness and kurtosis), or by using a dynamic approach such as dynamic programming (Fabozzi et al., 2006).

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Tranche

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"Tranche" (sometimes traunche) is originally a French word, meaning slice or cutting. In the private equity context, it is a partial financing round, also known as milestone round. If a company does not receive all of the capital of a financing round upfront, it will receive the capital in several cash injections. At each financing round, the investor makes a decision whether or not to invest and continue the relationship. At each tranche of a financing round, the investor has the option to stop financing, but only if the agreed milestones are not met; otherwise the investor is usually obliged to finance all tranches until the present financing round is completed. Slicing the total amount of each financing round into smaller cash injections gives the investor more control over how the capital is allocated. The option to provide just enough cash to the company, given its development needs, enforces a more disciplined focus to reach mutually agreed upon goals. Terms and conditions, which include estimates of company valuation, shares, and nonparticipation rights, are usually negotiated at each financing round but stay the same for each tranche, which represents only a financing fraction, payable upon completion of an agreed milestone. Cash injections may be given to a portfolio company as a bridge in anticipation of the next financing round, or on top of the financing round to maintain liquidity.

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Transparency

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Transparency refers to the degree of disclosure an investment manager provides to their investors. Investors may require transparency regarding the actual trading positions and leverage of the fund, the trading strategies employed by the fund, and the pricing, accounting, and risk management processes of the fund.

A completely transparent hedge fund may manage separate accounts, where all assets are held in the investor's trading account. This allows investors to see all positions and trading activity in real time. The transparent fund will clearly answer detailed questions about their trading strategy and allow investors to audit their trading and risk management processes and settlement procedures.

A partially transparent hedge fund may prefer not to manage separate accounts, and may only offer investments in commingled funds. The manager of this fund may describe the spirit of the trading strategy, while concealing the exact details of the process that generate the trades. The fund may offer investors aggregated data rather than the specific positions and trading activity of the fund. These aggregated risk reports will typically include statistics regarding the size and diversification of positions and the distribution of assets by market. Risk statistics within each market may also be disclosed, such as the average beta, sector weights, and the distribution of market capitalization for an equity portfolio. The manager will typically allow investors to view their operations if that is a requirement of receiving a new investment, but the exact algorithms used to generate trades or risk management processes will not be disclosed. Performance is disclosed only on a monthly basis, and the returns of the fund are audited on an annual basis. In order to reduce operational risks, it is important that these performance estimates and aggregated risk statistics come from the prime broker or the third party vendor of a risk management system. Should a manager have fraudulent intentions, performance or position data disclosed by the fund may be changed to conceal the true risks or performance of the fund.

An opaque fund is one that offers little to no transparency to investors. This fund manager will only disclose monthly performance, and sometimes may not pay for an annual audit. Trading strategies and positions are only discussed in broad terms, and are never disclosed in full. These funds, especially when there is a quantitative nature to the process, are often called "black box" funds, as it is difficult to see inside the manager's process. Institutional investors are often uncomfortable with funds that lack transparency, as it is difficult to ascertain the risk of the strategy and the skill of the manager.

Investors require transparency of their hedge fund managers to become comfortable with the manager's strategy during the due diligence process. Ideally, the manager will disclose enough about their trading process for the investor to determine the skill level of the manager before an investment is made. Transparency is also valuable to investors during the risk management and portfolio construction processes. Investors desire that their hedge fund portfolios have a low correlation to traditional investments, as well as a low correlation between the hedge funds in the portfolio.

Access to position level, or aggregated risk statistics, for the fund allows investors to clearly see the correlation between the fund managers in their portfolio. Once an investment is made in a hedge fund, transparency allows the investor to continue to monitor the progress of the fund. Should the fund manager choose to increase risk or leverage or modify the types of securities traded, an investor with a reasonable level of transparency would notice this divergence quickly, which allows them to have a timely conversation with the fund manager if they are concerned by these changes. At that time, the investor may ask the fund manager to reduce risk or return to the original trading style. If the investor is not satisfied with the response of the fund manager, the investor may choose to reduce the investment in that hedge fund to reduce the risk. A fund of funds manager may wish to have complete transparency of the underlying positions to aggregate all of the positions of the fund to see the exact portfolio. This helps the fund of funds reallocate capital between their hedge fund managers. Some funds of funds may implement hedges at the portfolio level when the aggregated risk of their fund investments exceeds a predetermined level.

Hedge fund managers may wish to limit the degree of transparency to investors for many reasons. The most common reason cited by managers is that their positions and their trading processes are proprietary, and that disclosure would reduce the value of the hedge fund management company. Should this information be disclosed to active traders or those who wish to profit at the hedge fund's expense, position level data in an illiquid market can, indeed, reduce the returns of the fund by increasing trading costs. However, the vast majority of investors and funds of funds do not have any interest in replicating the strategy of the fund or increasing the trading costs of the fund. Fund managers may be more wary of sharing their positions with their prime broker, especially if there is not a clear separation from the proprietary trading desk. Hedge funds may also decline to offer full transparency, as the amount of information may be overwhelming to investors. If a fund executes thousands of trades each month and holds hundreds of positions at a time, this information may be difficult for an investor to interpret. Partial transparency, including a monthly summary of portfolio risks, may allow investors the information they need, while reducing the privacy concerns of the hedge fund manager.

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Trend Following

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Trend following commodity strategies attempt to derive future expected performance from past historical performance.

This involves two steps. We first need to identify whether a trend has been established and secondly for how long it will continue. In essence, a trade follower will always be late to hop on a trend and will almost invariably be surprised when the trend ends (often as the result of an exogenous, i.e., unforecastable shock). Only if the trend continues for long enough to cover the costs from a trend reversal, will the strategy be profitable.

Return momentum strategies are the most common strategies in the commodity universe. They come in the form of either simple momentum (buy winners and sell losers) or crossover momentum (buy a commodity if the short run performance exceeds the long run performance). Generically we can express a trend following strategy as mom (h, s, l), where h denotes the holding period horizon, s the short-run moving average, and l the long-run moving average. For example, mom (3, 6, 12) denotes a momentum strategy that will invest into a commodity, if the 6 months moving average exceeds the 12 months moving average and vice versa. As the strategy is good for the next 3 months, the question arises, "what do we do after 1 month?" After all, a new signal arrived. Do we want to create an entirely new portfolio, throwing out our old 3 month view? Given that our holding period assumption is 3, we will for each period build a portfolio that is a mixture of the past three momentum portfolios. Equal weighting stacked portfolios implicitly assumes that there is linear decay in information ratio. While this is not necessarily true, it seems to be a robust assumption.

What are the economic foundations of trend following strategies? We start with behavioral finance models. Suppose we have a market with two types of investors, both exhibiting bounded rationality as in Hong and Stein (1999). One type of investors only reacts to fundamental information, disregarding the information in price changes, while the second type of investors disregards fundamental information and only reacts to price changes. If fundamental information spreads slowly, we will see commodity prices to initially underreact to the arrival of new information. This will kick-start momentum traders that have observed past prices to rise. Sitting on a self-accelerating strategy, momentum traders continue buying in an attempt to arbitrage the slower fundamental investors. Effectively this will lead to a market that shows both initial underreaction and final overreaction. A second explanation for the success of trend following commodity strategies is their link to business cycles. Given that commodities are closer to consumption goods than to assets, they are unlikely to be priced by a forward-looking discounting mechanism. As such they should be much more sensitive to changes in business cycle conditions as they lack the ability to look through to the future. Finally, it is intuitive that momentum strategies work best where it is hard for fundamental models to find fair values and as such learning from past prices is more widespread.

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Treynor Ratio

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The Treynor ratio is a risk-adjusted performance measure that was initially suggested by Jack Treynor (1966) as a ranking criterion. For a given portfolio, it is calculated by dividing the excess return obtained (i.e., return above the risk-free rate) by the level of risk incurred, which is measured as the beta of the portfolio. Mathematically

$$\text{Treynor ratio} = \frac{\text{portfolio return} - \text{risk-free rate}}{\text{portfolio beta}}$$

A higher positive Treynor ratio is always preferable as it implies that the risk-adjusted performance has been better (more return per unit of risk).

From a conceptual perspective, the Treynor ratio is similar to the Sharpe ratio, except that it uses the portfolio beta rather than its volatility as the relevant risk measure. As a consequence, it should be used only when beta is the relevant risk measure for an investor, that is when all of the unsystematic (company-specific) risk will be diversified away and only systematic (market) risk will remain in the investor's portfolio. In practice, however, it can still be used if the investment assessed represents a small portion of the investor's overall portfolio.

Investors who are not familiar with capital market theory and regression analysis often find the Treynor ratio difficult to interpret. This explains why the Treynor ratio has not been widely accepted by the general public. Nevertheless, it remains an essential tool in portfolio construction and analysis. Note that the Treynor ratio has been generalized to the case of multiple indexes by Hubner (2005). In this case, it is defined as the excess return obtained per unit of premium-weighted average systematic risk, normalized by the premium-weighted average systematic risk of the considered benchmark.

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Turnaround

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Turnaround refers to the positive reversal in the performance of a business, company, or the overall market. Financially distressed companies achieve a turnaround if they return to a profitable position. The downturn leading to financial distress can have different causes, such as a bad strategy or a poor operational efficiency.

The strategic or entrepreneurial turnaround comprises the efforts of a firm with financial difficulty to follow a return-to-growth strategy. It usually consists of controlling strategy components, such as restructuring the company's product or service offering, its primary markets, principal

technologies, distinctive competencies, and strategic alliances. Operating or efficiency turnaround represents the substantial effort of a distressed company to follow its current strategy in a more efficient fashion. In general, it consists of methods to control costs, use assets efficiently, and ameliorate production processes and their associated managerial and structural changes (Pearce and Robbins, 1993).

The characteristics of successful turnaround strategies are often contingent on the actions taken in high profile achievements: rapid and powerful decision-making, heavy cost cutting, divestitures, as well as stressing quality. Such perceptions are neither generally precise nor consistently advantageous. Additionally, they do not offer authenticated remedies for executives of firms encountering decreasing financial or competitive performance. There is a requirement for systematic theory building based on carefully designed and expertly executed empirical research on turnaround situations and responses (Pearce and Robbins, 1993).

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Uncovered Options

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Contrary to "covered options," the issuer of "uncovered options" does not hold the respective opposite position in the underlying. We further differentiate between selling uncovered calls and uncovered puts. For a premium, the issuer of an uncovered or naked call agrees to provide the underlying at some point in time in the future for a price determined in the present. As security and proof of his ability to deliver in the future, the issuer needs to deposit a margin of the option premium plus about 10–20% of the underlying with his broker. The risk of such a transaction is virtually unlimited. The issuer of a call expects prices to fall or at least a sideways movement of prices for the underlying on the one hand and judges the option premium to be overvalued on the other hand. For the issuer this means that the (overvalued) option premium overcompensates the price change risk, included in the underlying (Kolb et al., 2007). The risk of rising prices and hence the execution of the option can however be eliminated or mitigated at any time by closing the position or buying the underlying, in which case the option is transformed into a covered call. When dealing with an uncovered put, we can assume that the issuer of the put neither sold the corresponding underlying short nor has the money to buy the underlying. Compared with the uncovered call, again a limited possible return—the premium—faces a substantial risk. If the price of the underlying falls by an amount surpassing the premium, the issuer of the put faces a loss, which may end up being a multiple of his initial capital invested, but however, is limited by the complete loss of the underlying (Hull, 2005). The primary goal for the issuer of a put is to make a profit by obtaining the option premium, and by buying the underlying for a price below the market price.

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Underlying Commodity

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The underlying commodity is the cash commodity underlying a futures contract, forward contract, commodity or futures contract, whereby a commodity option is established and should be accepted or delivered when the option is exercised (Rogers, 2004; Spurga, 2006). The cash commodity is furthermore specified by the minimum quality of the delivered goods (see also Deliverable grade, p. 135) and by the delivery location. Due to this relationship there is a high correlation between the market price of the future/forward contract and the spot market price of the underlying commodity. Deviations from the perfect correlation lead to the so-called basis risk. Indexes can have several underlying commodities, using same commodity classes, for example, grain or different commodity classes like agriculture and energy.

Examples of underlying commodities:

- The IPE Brent crude oil future has the underlying Brent crude oil with delivery location Rotterdam.
- The LME copper futures have copper "Grade A" as underlying.
- CBOT wheat futures and KCBT wheat futures have wheat as underlying, but different deliverable grades: CBOT references to soft red winter wheat, KCBT to hard red winter wheat.
- The Goldman Sachs Commodity Index (GSCI) uses metals, agricultural products, and energy products as underlying commodities.
- The GSCI U.S. grain refers to the underlying commodities like corn, soybean, Chicago wheat, and Kansas wheat.

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Underlying Futures Contract

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The underlying futures contract is the specific futures contract that the option conveys the right to buy in the case of a call or to sell in the case of a put. On the commodities and fixed income securities option markets, the underlying contract is generally a futures contract because the futures contract is more liquid than the spot contract. Black (1976) has developed a formula to price a plain vanilla European option whose underlying is a commodity futures contract. Furthermore, this formula has been transposed to the computation of an option written on a bond futures contract. Black's formula may be written as follows for this last option: $c(0, T, s) = e^{-rT}[F(0, T, s) N(d_1) - XN(d_2)]$, where $c(\cdot)$ is the price of a call whose underlying is a zero-coupon bond futures, r the risk-free rate, T the duration of the option, s the bond duration, F the forward price of the bond, and $N(\cdot)$

the normal cumulative function. d_1 and d_2 are calculated as follows:

$$d_1 = \frac{\ln(F/X) + 0.5\sigma^2 T}{\sigma\sqrt{T}}$$

and

$$d_2 = d_1 - \sigma\sqrt{T}$$

In these equations, X stands for the strike price of the call and σ for the volatility of the underlying return. The above formula is highly praised in financial practice and is also used to price caps, floors, and swaps. These options are often priced by quoting the implicit volatility, computed by setting the market price of an option equal to the Black's formula (National Futures Association, 1998; Racicot and Théoret, 2004).

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Underpricing

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Underpricing is measured as the difference between the offer or opening price for the IPO's stock and its closing price, after the first day of trading, scaled by the offer price. The closing price is assumed to be the equilibrium or "true" value of the stock. In the case of underpricing, where the equilibrium price is higher than the initial opening price, the IPO firm receives less capital per share, relative to the equilibrium value of the IPO's stock (this is the opposite of overpricing where the difference is positive, i.e., the equilibrium price is lower than the offer or opening price). Underpricing is often referred to as "money-left-on-the-table" since the issuing firm could presumably have raised capital at the subsequent trading price but instead chose to leave money on the table by underpricing the shares. Let us now examine how underpricing is the usual case in the IPO world. For illustrative purposes, let us assume that bookbuilding is used and the IPO firm is called WeB-Genes—a pharmaceutical boutique with enough potential to have caught the attention of an investment banker (IB). The IPO offer price less the underwriter's fees is what WeB-Genes gets for its shares. To arrive at the final offer price, WeB-Genes and the IB negotiate a price interval that will be used by the IB as a starting point to test the interest for the shares of WeB-Genes for the clients in their book. The final price is typically within this interval except in hot IPO markets such as the Internet bubble period when shares were often priced above the initial price range estimates. Here, the important question is whether the price arrived at is the equilibrium market price. If the market price of the stock hovers essentially around the offer price so that the closing price is close to the offer price, then the offer price was close to the equilibrium price. In this case, the IPO firm gets "full" value and the IB rakes off its 7% (see Chen and Ritter, 2000) and two of the three major players are happy; but, how about the subscribers? After all, they buy the stock—did they also buy the firm? This

is the nub of the issue. What is the incentive for the investors to buy the shares?—expected market value appreciation. So here is the dark side of the IPO world. Because the IB gets a 7% commission based upon the offer price, they want to keep the price sort of high and they have really done their quantity/price trade off homework. Seven percent of a reduced price where lots of shares are placed is a lot more than 7% of a few high-priced shares. So they figure "let's shift the benefits from WeB-Genes to the subscribers." They reason: "We will pitch the price on the low side and that will stimulate the demand for placements of WeB-Genes; we make out fine and the subscribers are happy. *Happy* is an important variable in the IB's loyalty equation. So this keeps lots of potential clients, who are bargain hunters at heart, in their book. Who suffers? WeB-Genes because they get less capital than they could have if the offer had been priced at or near the equilibrium price per share. Is underpricing the norm? According to Ritter (2006), from 1975 to 2005, IPO stocks have been underpriced on average in every year except 1975. So why does underpricing seem to be the "economic" pricing rule? Let us look more closely at WeB-Genes. They were started by a microbiologist, a geneticist, and a rocket scientist: combined business savvy—the null set. They are delighted to secure the financing. An additional reason is offered by Loughran and Ritter (2002, p. 414). WeB-Genes may go along with underpricing because they will sum the wealth loss due to underpricing of the sold shares with the larger wealth gain on the retained shares due to the subsequent price increase. From an economic perspective, this assumes that WeB-Genes has shares to issue/re-issue, and that the price jump combines with the shares that could be issued so that they make up, in NPV terms, the sum forgone. (For related information see Overpricing, p. 341, and Bookbuilding, p. 47.)

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Underwriter

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Underwriters are the large financial service institutions (bank, syndicate, investment house), mainly acting as intermediates between customers and public. They provide a wide range of products, which cover from corporate bonds to commercial papers. Once a borrower wishes to get a loan, it is the underwriter's role to make detailed credit analysis before its granting based on credit information such as salary and employment history (Ellis et al., 2000).

Habib and Ljungqvist (2001) argue that issuers do not choose underwriters randomly, nor do banks randomly agree which companies to take public (see Fernando et al., 2003). Optimizing agents presumably make the choices we actually observe. Moreover, in IPO cases, issuers likely base their choices, at

least in part, on the underpricing they expect to suffer. This leads to endogeneity bias when regressing initial returns on underwriter choice. For instance, a company that is straightforward to value will expect low underpricing, and so has little to gain from the greater certification ability of a prestigious underwriter. A high-risk issuer, on the other hand, will expect substantial underpricing in the absence of a prestigious underwriter.

Carter and Manaster (1990) provide a ranking of underwriters based on their position in the financial press that follows the completion of an IPO. This ranking, since updated by Jay Ritter, is much used in the empirical IPO literature. Megginson and Weiss (1991) measure underwriters' reputation instead by their market share, and this approach is also widely used.

A specific way to reduce the informational asymmetry is to hire a prestigious underwriter or a reputable auditor. By agreeing to be associated with an offering, prestigious intermediaries "certify" the quality of the issue. In the Benveniste and Spindt framework, investors incur no cost in becoming informed. If information production is costly, underwriters need to decide how much information production to induce. Sherman and Titman (2002) explore this question in a setting where more information increases the *accuracy* of price discovery, resulting in a trade-off between the (issuer-specific) benefit of greater pricing accuracy and the cost of more information production.

Busaba et al. (2001) show that underwriters can reduce the required extent of underpricing if the issuer has a credible option to withdraw the offering. Downplaying positive information increases the likelihood that the issuer will withdraw, which reduces an investor's gain from misrepresenting positive information.

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Underwriting Spread

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When an investment bank issues stock to the public in the secondary market they do so at some expense to themselves. Therefore, to guarantee themselves a profit they engage in simple arbitrage. That is, they agree to buy securities from an issuer in the primary market, at a predetermined price and then attempt to resell these securities to the public, in the secondary market, at a higher reoffering price. The difference between these two prices is the gross spread or underwriting spread. Investment banks attempt to sell these securities to their existing client

base *via* an initial public offering (IPO) or to the general public, if the existing investors are not interested. In today's global financial markets, these customers could be investors located anywhere in the world and firms must therefore use their marketing skills to resell securities. The size of the gross spread, and thus the profit for the investment bank, depends on several factors, including the number of shares to be issued, the credit worthiness of the original issuer, the perceived risk of the issue, etc.

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Unseasoned Equity Offering

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The sale of common equity that has never been traded on an organized stock exchange is an unseasoned equity offering. The pricing of such offerings by the issuing company and the investment banker advising on the issue would take into account relevant information available in the primary equity market. This would normally include not only valuation information generated by the investment banker, but also investor demand information obtained from information gathering activities such as bookbuilding (Draho, 2004). Nevertheless, whatever price is determined in the primary market for an initial public equity offer does not include the wider secondary market information that could be brought to bear on the pricing when trading begins. That is why there is evidence across stock markets all over the world that when an initial public offer starts trading on the secondary market, the first day price, on average, is higher than the price at which the equity security was sold in the primary market. This phenomenon is referred to as underpricing. Therefore, until an initial public offer has been exposed to the rigors of pricing on the secondary market, such stocks are deemed to be unseasoned. The process of sub-jecting the price of the initial public offer to secondary market-wide influences—seasoning—begins on the first day of trading. The length of the seasoning period could vary from company to company depending on the flow of information about the company and analysts following. However, any company that makes further issue of equity securities on the market after an IPO would have considered its equity to be seasoned.

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Up Capture Ratio

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The up capture ratio is a measure of a manager's sensitivity to an index when the

index has positive returns. It is calculated by dividing the manager's annualized performance return for the intervals of time during the measurement period when the index was positive by the index's positive returns over the same intervals (Davidow, 2005). For example, if the S&P 500 was up 100 basis points, and a manager was up 35 basis points over the exact same period of time, the up capture ratio would equal 35%. An up capture ratio that is greater than 100% indicates a manager returned more than the index when the index had positive returns. Likewise, an up capture ratio that is less than 100% indicates a manager returned less than the index when the index had positive returns. Lastly, an up capture ratio that is negative indicates a manager had negative returns when the index had positive returns. Since the up capture ratio measures how much of the positive index returns a manager captured, more is better. However, the up capture ratio (and all risk measures) should be evaluated in conjunction with other investment metrics to best assess the manager's performance and risk profile.

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U.S. Equity Hedge

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Equity hedge funds, also known as long/short hedge funds, are managed by managers that combine long and short exposures in the equity markets (Stefanin, 2006). This strategy is the closest to the one applied by A. W. Jones recognized as the founder of the hedge fund industry and the first hedge fund (see Nicholas, 2000). The underlying idea of his fund was to control the market risk. Returns have two main sources and depend on the manager's security selection ability to buy and sell stocks. Leverage is usually used to magnify fund returns. The

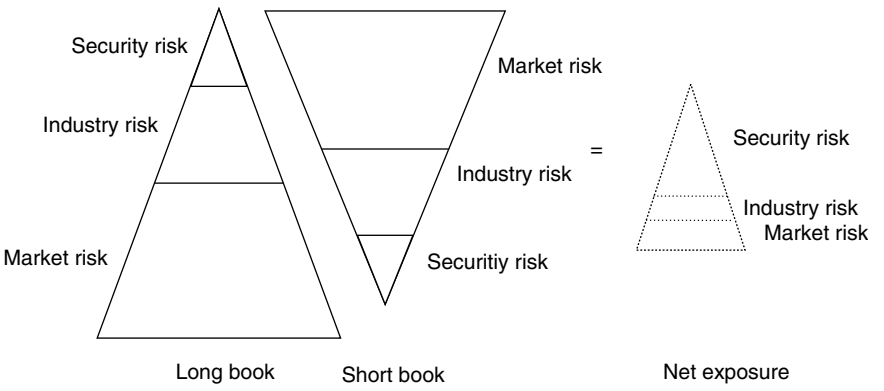

FIGURE 1
Equity hedge strategy.

majority of long/short managers base their stock selection on fundamental analysis and typically use various valuation methodologies (discounted cash flow, free cash flow, etc.). They also frequently take historical prices into account for entering and getting out of positions (technical analysis may be used to determine the timing). Every single long/short manager tries to identify undervalued longs, overvalued shorts, and predict market direction to determine the funds' growth and net global exposure. As the number of long/short funds increases, many funds become specialized in certain specific markets. Some funds invest only in specific sectors and certain regions, or even use market capitalization when selecting stocks. Some managers are value driven while others focus on growth or combine the two. Many U.S. equity hedge managers focus strictly on various U.S. markets and the strategy is illustrated in Figure 1. Both the long and the short books combine market risks, industry risks, and security risks but the unwanted market and industry risks can be hedged, leaving the global portfolio with some market and industry risks that depend on the views of the portfolio managers and a larger portion of security risk.

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V

Valuation Guidelines

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Investors in private equity are interested to be continuously informed about the value development of their investments during the lifetime of the fund. Due to the illiquidity of the asset class and absence of a secondary market, the performance measurement of ongoing unrealized portfolio company investments (interim valuation) is complicated and offers high discretion for fund management in valuing the funds' investments. Therefore, private equity industry valuation guidelines have been developed to standardize valuation approaches, increase transparency and promote confidence between investors and fund managers, as well as set best practice examples for the private equity industry.

The first set of valuation guidelines for venture capital and private equity investments was introduced in the United States in 1989 by the U.S. National Venture Capital Association (NVCA). In Europe, the first set of valuation guidelines was published by the British Venture Capital Association (BVCA) in 1991 followed by valuation standards of the European Venture Capital and Private Equity Association (EVCA) in 1993. Revised standards have been published by both organizations in 2003 and 2001, respectively. However, all those initiatives were based on a conservative framework mainly with a cost-based approach. According to this approach, an investment in a fund should be carried at cost unless a material impairment indicated a write-down or a new financing round including a new outside investor supported an increase in the value of the portfolio company.

U.S. Generally Accepted Accounting Principles and International Financial Reporting Standards, however, require the fair value measurement of portfolio companies. In addition, fund investors themselves want fair values to be reported and need this information from their fund managers. Consequently, the Private Equity Industry Guidelines Group (PEIGG), a volunteer group of representatives from the private equity industry (investors, general partners, and service providers from both the venture capital and buyout segment), issued U.S. Private Equity Valuation Guidelines in December 2003 (cf. Private Equity Industry Guidelines Group, 2007). In Europe, the EVCA together with the BVCA and the French private

equity association (Association Francaise des Investisseurs en Capital, AFIC) introduced the International Private Equity & Venture Capital Valuation Guidelines in March 2005 (cf. AFIC/BVCA/EVCA, 2006). Meanwhile, more than 35 regional and national private equity associations support the International Private Equity & Venture Capital Valuation Guidelines, which are continuously reviewed and further developed by an appointed Valuation Guidelines Board consisting of academics and practitioners. Both recently introduced valuation guidelines provide detailed provisions how fund managers derive a fair value of their portfolio companies. Empirical studies indicate that the International Private Equity & Venture Capital Valuation Guidelines in Europe are more accepted than the U.S. Private Equity Valuation Guidelines in the United States (Mathonet and Monjanel, 2006 for Europe; Tuck School of Business, 2005 for the United States). Another set of valuation standards, which was originally developed by the CFA Institute for traditional asset classes (public equity and fixed income portfolios), is meanwhile expanded to private equity. Those Global Investment Performance Standards are more orientated toward future investors during fundraising and not focused on existing investors. However, they also recognize the fair value as basis for valuation. An overview of the evolution of valuation guidelines for the private equity industry is provided in Achleitner and Müller (2006), Müller (2008) and Figure 1.

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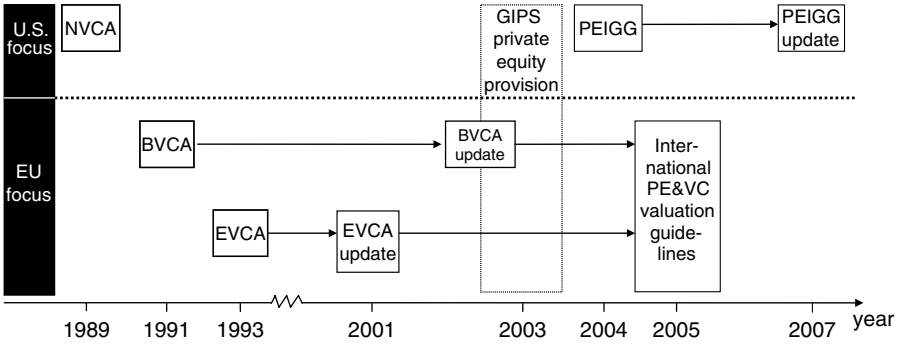

FIGURE 1
Development of Major Industry Valuation Guidelines and Harmonization. (*Source*: Based on Müller, 2008.)

Value-Added Monthly Index

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The Value-Added Monthly Index (VAMI) reflects the performance of a hypothetical investment of \$1000 over time. At inception $t = 0$ the VAMI is equal to \$1000 and the monthly rate of return of the underlying asset

$$1 + \mathrm{ROR}_t = \frac{V_t}{V_{t-1}}$$

is added:

$$\mathrm{VAMI}_0 = \$1000$$

and

$$\mathrm{VAMI}_t = \mathrm{VAMI}_{t-1}\left(\frac{V_t}{V_{t-1}}\right)$$

Dividends and interest rates are reinvested via compounding into the VAMI. The VAMI provides an easy comparison between different assets with the same starting date and quantifies the potential monetary risk and chances of a \$1000 investment (Lackey, 2004). Therefore, the VAMI is a simple kind of back testing the risk return characteristics of an asset. If the ROR_t are net of all fees then the index represents the value of the hypothetical \$1000 investment before tax. For underlying assets with a non-U.S. Dollar denomination, the foreign exchange rate has to be considered.

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Value-at-Risk

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Value-at-risk (VaR) is a single number used for risk management summarizing the potential portfolio losses. In statistical terms, VaR is the quantile of the loss distribution. VaR is universal in the sense that we can use it for portfolios of any type, that is, portfolios involving market, credit, and operational risks. Already used by major financial firms in the late 1980s, VaR is serving as the market standard today. Smaller banks, financial entities such as hedge funds, institutional investors, and nonfinancial institutions measure, manage, and often disclose risk in terms of VaR. In its amendment of 1996, the Basle Committee on Banking Supervision recommended the use of VaR for regulatory reporting and proposed to allow banks to calculate their capital requirements for market risk based on their internal VaR models. In the new Basel II accord, this recommendation was extended to credit and operational risks. With VaR reporting requirements incorporated into international banking and accounting regulations, VaR is now the preeminent measure for financial risk.

An informal definition for VaR, as it is commonly used in practice, is as follows. The VaR of a portfolio with current value W is the minimum loss L that a portfolio can suffer after a pre-specified time period in the v% worst cases, when the absolute portfolio weights are kept constant. When calculating the VaR of a market risk position, a typical choice for the length of the time period is 10 days. In Panel 1 of

Figure 1, we plot the distribution of a hypothetical portfolio's profits and losses. The solid vertical line marks the VaR. In this example, the minimum loss of the portfolio in the 5% worst cases (labeled "B") is equal to 1100 monetary units.

Formally, the VaR can be defined as

$$\mathrm{VaR}_t^{v,w} = \inf\{L \geq 0 \big| P(W_t - W_{t+\tau}^w \geq L \big| F_t) < v\}$$

where $P(W_t - W_{t+\tau}^w \geq L \big| F_t)$ denotes the statistical probability that the loss of the portfolio under constant portfolio weights w will be equal or above L. Usually, v% worst cases refer to the 1 or 5% worst cases. We note that we can reverse the above definition by saying that the VaR of a portfolio is the maximum loss a portfolio can suffer after one time period in the $(1-v)$% best cases, when the absolute portfolio weights remain constant. In Panel 1 of Figure 1, the 95% best cases correspond to the area labeled "A."

The main approaches to VaR computation can be categorized into three classes: parametric, historical simulation, and Monte Carlo simulation. The parametric approach

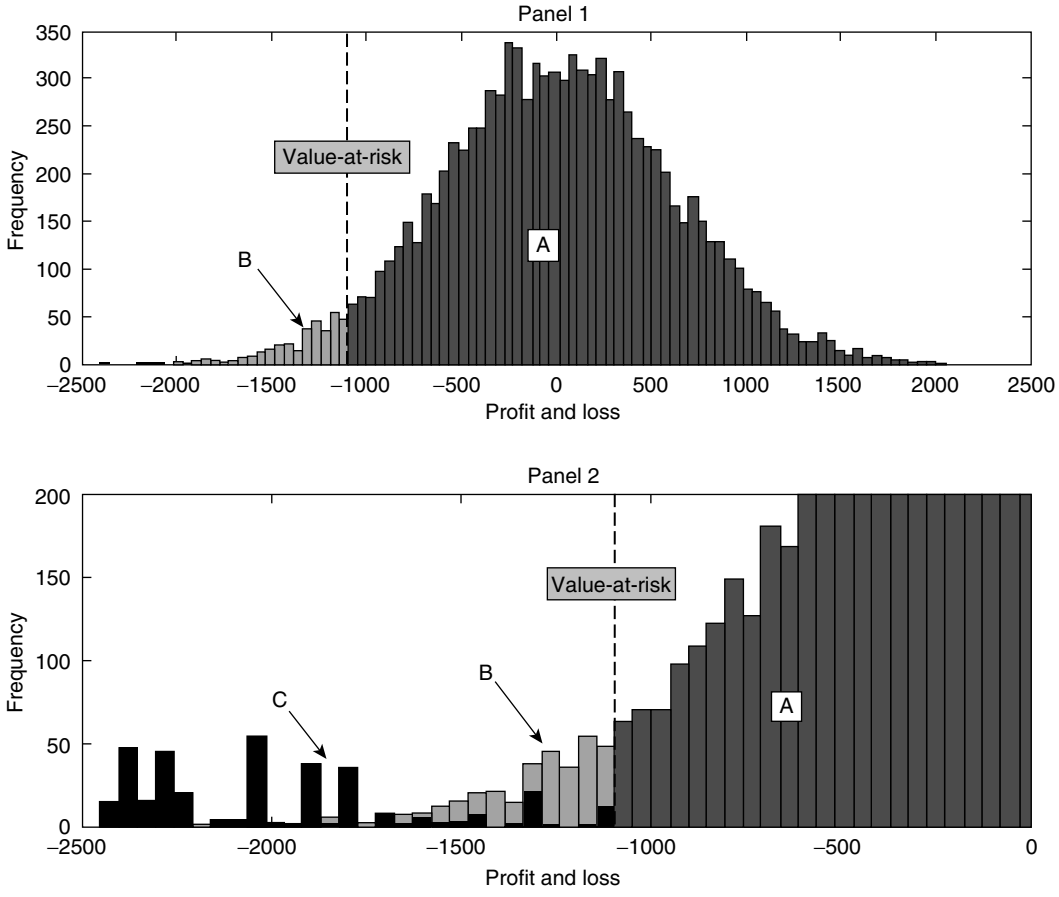

FIGURE 1
Value at risk for a hypothetical portfolio.

is often based on the assumption that the underlying market factors have a multivariate normal distribution. Such an approach allows for analytical tractability and computational speed. However, it may fail to capture important characteristics of the portfolio's tail distribution, when there are either nonlinear instruments, such as options, or when returns depart from the normality assumption, or both. Historical simulation is a simple technique that requires relatively few assumptions on the statistical distributions of the underlying market factors. For the VaR calculation, we simply draw from historical data. Therefore, the number is calculated as if history were to repeat itself. Rather than using the historically observed changes in the market factors, Monte Carlo simulation draws from a statistical distribution that is calibrated to the historical data.

Although VaR is widely used in today's risk management practice and serves as a standard in risk reporting, we have to be aware that no theory exists to prove that VaR is an appropriate risk measure upon which to build optimal decision rules. Indeed, VaR may serve as a risk measure only under the very restrictive assumption of normal returns. It fails to comply with some coherency properties that any risk measure should intuitively share (Artzner et al., 1999).

Most important from a practical viewpoint, VaR misses the risks in the tail of the loss distribution. To see this, consider Panel 2 of Figure 1. Here, we add a different distribution of losses beyond the VaR level (labeled "C"), which can be generated, for example, through the use of options, and we leave the distribution of the portfolio above the VaR level unchanged. We now have two distributions with different tail characteristics. However, for both distributions, the VaR is unchanged. Clearly the portfolio with tail distribution "C" may incur larger losses with much higher frequency than the portfolio with tail distribution "B." Obviously, the VaR concept fails to capture this difference in the tails and, hence, might not be a sound risk measure (see also the discussion in Leippold, 2004).

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Variance Swap

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A variance swap is an over-the-counter (OTC) derivative contract, which pays out the excess realized volatility above a strike volatility agreed in the contract. In other words, variance swaps allow exposure to pure volatility without reference to the price of the underlying asset. Variance swaps are now commonly traded and standardized according to the International Swaps and Derivatives Association (ISDA) conventions.

Variance swaps are usually traded and marked in terms of the number of *vega* (volatility points), and the payoff is given by

$$\text{Payoff} = \frac{\text{vega}}{2\sigma_{\text{K}}}\left(\sigma_{\text{R}}^2 - \sigma_{\text{K}}^2\right)$$

where σ_R is the realized volatility; σ_K the strike volatility; and vega the value per volatility point.

As this shows, the payoff to a variance swap is not quite the same as the linear difference between implied and realized volatility, though it is fairly close for small differences between realized and strike volatilities. For example, assume a stock is currently trading at an implied volatility of 20%. A trader believes this is cheap, and buys 500,000 vega of a 1 year variance swap struck at 20. The stock subsequently reports worse than expected earnings and falls sharply. As a result, its realized volatility ends up being 23%. The payoff to the simple difference between implied and realized volatility is

$$\$500{,}000(23\% - 20\%) = \$15{,}000$$

However, the trader bought a variance swap. The actual payoff is

$$\$500{,}000/(2 \times 20\%) \times (23\%^2 - 20\%^2) = \$16{,}125$$

In general, the payoff to variance swap is nonlinear. Moreover, the lower the strike of the variance swap, the more convex the variance swap payoff per volatility point. Figure 1 shows generalized payoffs to variance swaps and volatility swaps.

PRICING VARIANCE SWAPS

Variance swaps have become the prevalent vehicle for trading volatility despite the convex payoff because of the ease of hedging and transparency of pricing. A variance swap can be replicated with a static portfolio of options. Pricing is based on the value of this portfolio. Volatility swap pricing is only possible using stochastic modeling and hedging requires dynamic rebalancing of the option portfolio.

Constant exposure to volatility without reference to the directional change in the underlying implies constant exposure to the local moves in price (*gamma*), regardless of

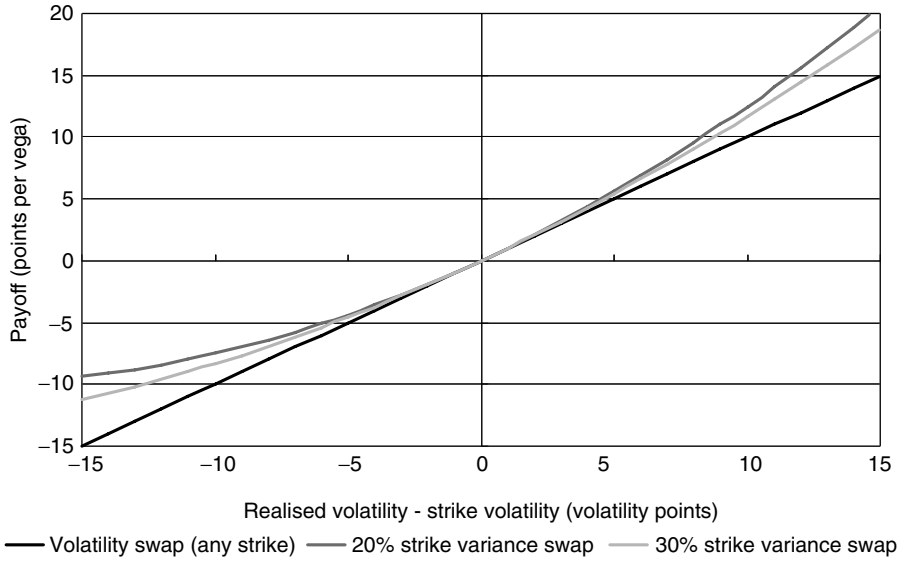

FIGURE 1
Payoffs to variance swaps and volatility swaps. (From Deutsche Securities (illustrative only).)

where the underlying price ultimately ends up. Perfectly constant gamma occurs in a portfolio of straddles that is weighted in inverse square proportion to strike ($1/K^2$) with strikes running from 0% of spot to ∞ in infinitesimally small steps. In practice, this is approximated by a finite strip of calls in strikes above the money and puts below the money, depending on liquidity and availability of strikes. The higher weighting in lower strike puts results in a small short *delta* exposure that must also be hedged.

Constant gamma implies continuous dynamic delta hedging. Since this is costly in practice, delta hedging of variance swaps is normally done at regular intervals. Often this interval is daily, but the interval depends on liquidity of the underlying and transaction costs.

There are two key differences between the price of at-the-money implied volatility and variance swaps. First, bid-offer spreads are wider in variance swaps than at-the-money straddles. The main reason is that the further-from-the-money options are less liquid and trade at wider bid-offers. Figure 2 illustrates this effect (assuming no volatility skew).

The second difference is due to implied volatility skew. Skew is caused by the unequal demand for out-of-the-money puts and out-of-the-money calls. In "normal" equity market conditions, out-of-the-money puts trade at a premium to out-of-the-money calls because the demand for protection against losses is greater than the demand for speculative upside. The combined effect of skew and bid-offers away from the money is that the bid-offer of variance is generally wider than at-the-money volatility, and the mid-price of variance is usually higher than the mid-price of at-the-money volatility, as illustrated in Figure 3.

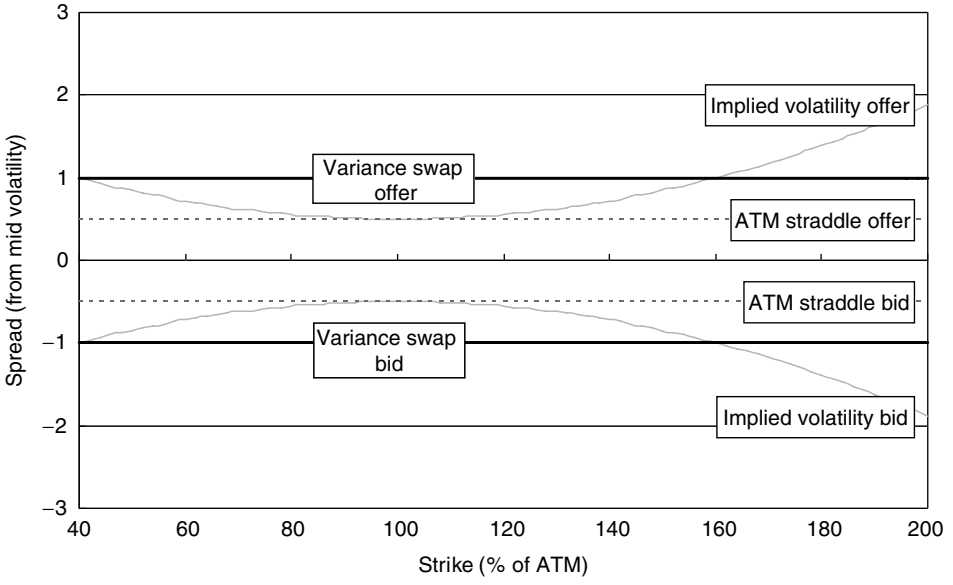

FIGURE 2
Bid-offers of implied volatility and variance swaps with no skew (Illustrative). (From Deutsche Securities (illustrative only).)

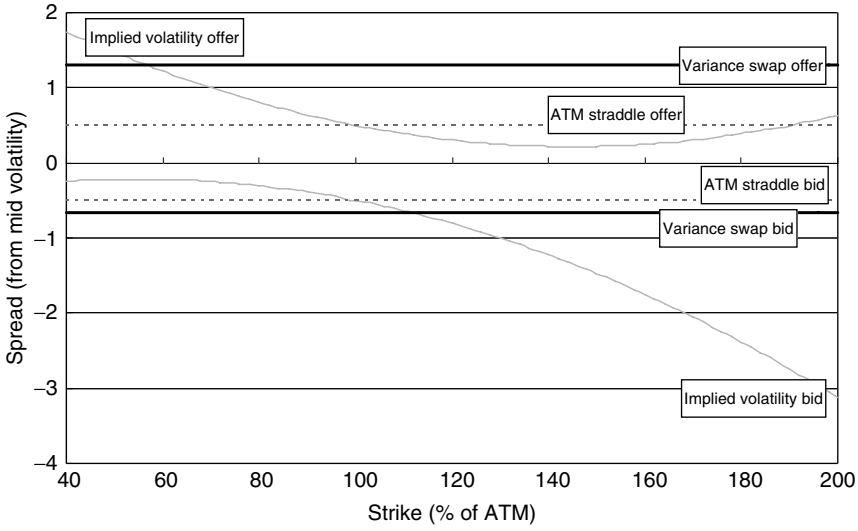

FIGURE 3
Bid-offers of implied volatility and variance swaps with skew (Illustrative). (From Deutsche Securities (illustrative only).)

TYPICAL TRADES USING VARIANCE SWAPS

Apart from basic directional positions on volatility, common trades using variance swaps include term structure and spread trades. In a term structure trade, the position is the difference in variance between two expiries in the same underlying. In a spread trade, the position is the difference in variance between two different underlyings.

Another common variance swap trade is the correlation (or dispersion) trade. The volatility of an index depends on the volatility of its constituents and the correlation among them. In general, index volatility is given by

$$\sigma_{\mathrm{I}}^2 = \sum_{i=1}^{N} \varphi_i^2 \sigma_i^2 + \sum_{i=1}^{N} \sum_{j \neq i} \omega_i \omega_j \sigma_i \sigma_j \rho_{i,j}$$

where σ_{I} is the index volatility; σ_j the volatility of the jth constituent; ω_j the weight of the jth constituent in the index; and $\rho_{i,j}$ the correlation between the ith or jth constituents.

It follows that there is an average correlation between the constituents, given by

$$\rho = \frac{\sigma_{\mathrm{I}}^2 - \sum_{i=1}^{N} \omega_i^2 \sigma_i^2}{\left(\sum_{i=1}^{N} \omega_i \sigma_i\right)^2 - \sum_{i=1}^{N} \omega_i^2 \sigma_i^2}$$

where ρ is the average correlation between the index constituents; σ_{I} the index volatility; σ_j the volatility of the jth constituent; and ω_j the weight of the jth constituent in the index.

In other words, a correlation trade is nothing more than a specialized spread trade between the variance of an index and its constituents. The weighted average correlation between each pair of stocks is traded by buying the index variance and selling the variance of index constituents in correctly weighted proportion. When correlation in

TABLE 1

Correlation Trades and Dispersion Trades Summarized

Trade	Buy/Sell	Strategy	Quotation	Positive Payout Condition
Correlation	Buy	Sell the weighted variance of stocks, buy the variance of the index	55–62 (indicates the average off-diagonal correlation of 0.55 and 0.62)	Realized single stock variance rises less (or falls more) than realized index variance (i.e., correlation rises)
	Sell	Buy the weighted variance of stocks, sell the variance of the index		Realized single stock variance rises more (or falls less) than realized index variance (i.e., correlation falls)
Dispersion	Buy	Buy the weighted variance of stocks, sell the variance of the index	3.5–2.5 (indicates the spread between average implied stock volatility and implied index volatility)	Realized single stock variance rises more (or falls less) than realized index variance (i.e., stocks disperse)
	Sell	Sell the weighted variance of stocks, buy the variance of the index		Realized single stock variance rises less (or falls more) than realized index variance (i.e., stocks converge)

Source: Deutsche Securities.

the market is high, the index variance must be high relative to the average variance of its constituents. When correlation is low and component stocks move relatively independently of one another, the index variance must be low relative to average constituent stock variance.

The trade can be seen from the opposite point of view: when stocks trade in unison, the spread between index volatility and stock volatility is low, and when stocks disperse and trade more independently of one another, the spread widens. Thus a "dispersion" trade closely resembles a correlation trade, and both effectively do the same thing: trade the spread between index variance and single stock variance. These trades are summarized in Table 1.

VARIANCE SWAP VARIANTS

Variance swaps have developed over time to comprise a number of common variants. Forward starting variance is quoted like a variance swap, but the payoff is the volatility between two dates in the future. Conditional variance swaps pay out relative to the realized variance when the underlying trades above/below a set level. Calls and puts on variance have the right to buy/sell variance at some strike.

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Venture Capital

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Venture capital is a segment of the private equity market that invests in young or high growth companies. Sometimes venture capital is used as a more general term that encompasses buyouts of existing firms, synonymous with *private equity*; this is especially common in Europe. However, Gompers and Lerner (2001) have provided the traditional definition of the term: "independent, professionally managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high growth companies" (p. 146). The first part of this entry will describe the venture capital industry in the United States, where it originated and is most developed. The final section will discuss venture capital in other countries.

Venture capital firms invest in high risk, high reward ventures. Because these investments are illiquid—firms target investments that can take five or more years to mature—returns must compensate by being significantly higher than for publicly traded stocks. Not all of these risky ventures are expected to succeed; venture capital firms do not seek a good return from each investment. Rather, they look for a small percentage of their portfolio, deemed *home runs*, to earn extraordinary returns and thereby create an excellent return for the overall portfolio. As each investment selected should show the potential to become a home run, venture capitalists seek investments that offer a potential annual return of greater than 50%. This drives funding into high growth opportunities in high technology firms—communications, computers, biotechnology, and medical markets—or to companies with the potential to transform a large conventional industry, as FedEx did for shipping services and Staples did in retailing.

The venture capital industry began in 1946 in the United States when American Research and Development (ARD) was founded by New England area business leaders looking to encourage new economic development to replace the shrinking textile industry. ARD was the first firm to raise a pool of capital that was not based on family fortunes, and as such was the progenitor of the modern venture capital industry. ARD is famous for the $70,000 investment they made in 1957 for a 77% stake in Digital Equipment Corporation that grew to a value of $355 million by 1971. This proved to be the industry's first home run, and it provided half of ARD's profits over its 25 year history (Gompers and Lerner, 2001). Many other home runs followed, including those of Apple Computer, Amazon, and Google, all of which have played an important part in this industry. Although the venture capital market in the United States is the most developed in the world, it is still a relatively small market as venture capital firms invest annually in fewer than 2500 companies. Nonetheless, the venture capital industry in the United States has had a significant impact both on innovation and on economic growth (Gompers, 2001).

Venture capital funding may be provided by banks, government agencies, corporate venture capital divisions, or wealthy individuals known as *angels*, but in the United States most venture capital is provided by *limited partnerships*. The fund is a financial partnership, where the venture capital firm acts as the *general partner*, looking to raise money from investors and then to deploy this capital in promising start-up ventures. The capital is provided by *limited partners*, either wealthy individuals or institutions (typically university endowments or pension funds), so named because their liability is limited to the amount that they contribute; they are restricted from actively participating in the management of the fund. Venture capital firms raise a series of sequential *funds*, each accounted for separately, that are limited in both capital and time (Pearce and Barnes, 2006). Each limited partner agrees to provide a portion of the capital up to his/her pro rata share of the maximum. The fund is limited in time to 10 years (but extensions are frequently allowed); the first few years are focused on investing the capital and the latter years on harvesting the portfolio, converting the investments back to cash through the sale of the start-up companies to established firms or by taking them public (Pearce et al., 2006).

In the 1960s, attempts to bring the venture capital model from the United States to other countries met with failure. Since then many studies have shown the importance of a number of elements necessary to support the creation of a venture capital market. These include a well-developed legal system, access to capital markets so that investors can get liquidity, a workforce culture that allows for flexible *recombinations*, and government support in the form of favorable regulations as discussed in a series of essays in Kenney (2000). Around the world, governments have become more supportive of initiatives to encourage the development of local venture capital markets as a way to spur innovation and economic development. Since the 1990s venture capital has become well established both in Europe and Asia. The most active overseas markets are found in London, Hong Kong, Israel, Taiwan, and Tokyo (Kenney et al., 2004) although there is some venture capital activity in almost every country around the world. Globally, venture capital practices are not homogeneous. For example, in Europe venture capital statistics include management buyouts, and there is a much higher involvement by conventional banks. As a percentage of GNP, venture capital investment is also much smaller in Europe and in Asia than in the United States, but the industry is developing rapidly, especially in China and India (Bottazzi and Da Rin, 2001). More recently there are signs that venture capital is becoming a global marketplace. Venture capital inflows and outflows have become quite significant, with many established firms starting offices and joint ventures in rapidly developing countries (Wright et al., 2005).

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Venture Capital Financing

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Venture capital funds finance privately held entrepreneurial firms in their earliest stages of development. Financial contracts between venture capitalists and entrepreneurs specify both cash flow and control rights, and these rights are independently allocated. In the United States, financing terms are typically set out with convertible preferred equity (Gompers, 1998; Kaplan and Strömberg, 2003), and there is a unique tax bias in favor of the use of convertible preferred equity (Gilson and Schizer, 2003). In contrast, in all non-U.S. countries where data have been collected, a variety of securities are used by venture capitalists and common equity tends to be the most frequently observed security; for Canadian evidence, see Cumming (2005a, 2005b; 2006), for European evidence, see Bascha and Walz (2007), Cumming (2002), Schwienbacher (2002), and Kaplan et al. (2007); for evidence from developing countries, see Lerner and Schoar (2005). U.S. venture capitalists that finance entrepreneurial firms based in Canada use a variety of securities, and common equity is used most frequently (Cumming, 2007). The use of different securities in venture capital financing arrangements depends on expected agency problems (Cumming, 2005a), and differences in institutional features across countries (Cumming, 2002, 2005b; Lerner and Schoar, 2005; Kaplan et al., 2007).

Control rights in venture capital financing arrangements specify both control and veto rights. Frequently observed control rights include venture capitalists' right to replace CEO, right for first refusal at sale, co-sale agreement, drag-along rights, antidilution protection, protection rights against new issues, redemption rights, information rights, and IPO registration rights. Frequently observed veto rights include venture capitalist veto powers over asset sales, asset purchases, changes in control, and issuance of equity. Control and veto rights tend to be used more frequently when expected agency problems are more pronounced, and when venture capitalists seek to influence the exit outcome in terms of an initial public offering or acquisition exit (Cumming, 2002; Gompers, 1998; Kaplan and Strömberg, 2003).

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Venture Capital Method

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Venture capital method is a method for evaluating start-up firms based on their financial projections. Although there are different variations of this method, most examine a short-term forecast—typically 5 years—and seek to evaluate the business at this future point in time. The forecast typically includes projected revenues, cash flows, and net profits. The valuation method assumes that the investors will liquidate their investments at the end of the fifth year and the company will be evaluated using price/earnings and other ratios of similar firms in the industry (Sahlman, 2003). This projected evaluation is then discounted by a high discount rate, typically 30–50%, given the illiquidity and high risk of the investment. This calculation yields the current valuation of the start-up business. If interim financing rounds are foreseen, then the investment is diluted. The venture capital method involves many assumptions and the results can vary widely depending on the specific computations of the person doing the analysis. Although this method is commonly used in the venture capital industry, it has been criticized for being too simplistic—there are related methodologies such as the weighted average cost of capital (WACC) that are considered far more accurate (Gompers, 1999). However, the venture capital method has the advantage of being readily understood both by venture capitalists and the entrepreneurs that they fund.

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Venture Capitalist

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A venture capitalist refers to an investor who invests either their own funds or on

behalf of other investors, in start-up companies. Venture capitalists, whether they belong to an established venture capital firm or act on their own, play an important role in forging linkages among a diverse set of organizations—investment banks, universities, large corporations, entrepreneurial companies—that are critical to the innovation process.

Owing to their participation in different industry networks, venture capitalists are well positioned to spot and create nascent investment opportunities in different sectors of the economy. By participating in scientific breakthroughs and the formation of new companies, venture capitalists catalyze and accelerate technological change. A good venture capitalist can therefore create substantial wealth not only for themselves and other investors, but also for the economy.

Venture capital firms can take a variety of organizational forms that range from specialist firms with only a small fund of about U.S. $10 million to firms with more than U.S. $10 billion under management. The institutional investors in venture capital firms include private and public pension funds, endowment funds, banks, corporations, insurance companies, and wealthy individuals. There are numerous kinds of venture capital companies, but a vast majority of them invest their capital through funds set up as limited partnerships in which the venture capital firm acts as the general partner. The most frequent type of a venture capital firm is an independent venture firm having no relationship with any other financial institution. Besides stand-alone venture capital firms, many corporations also set aside a pool of funds for venture capital investments. This is commonly referred to as "corporate venturing"; besides financial return targets, corporate venturing seeks to advance the corporation's strategic objectives, either to identifying new technologies that may be incorporated into existing products or to acquiring an emerging business to add to the corporation's business strategy.

The venture capital firm typically organizes its partnership as a pooled fund—with a life span of 10–15 years—comprising the general partner and the investors as the limited partners. A venture capital firm may manage more than one fund at any point in time. Typically, a venture capital firm raises another fund a few years after closing the first fund; this is in order to continue investing in firms and providing more opportunities for existing and new investors. These different funds may possess similar investment mandates or they may be tailored to suit different investor preferences for the sectors or stage of the development of the start-up company.

The compensation structure for venture capital firms is performance-based. As an investment manager, the venture capital firm will typically charge a management fee to cover the costs of managing the committed capital, as well as a carried interest, which refers to the division of the profit proceeds to the general partner. Depending on their investment focus and mandate, venture capitalists may be generalists, investing in numerous industry sectors, or different geographic locations, or in a variety of stages of a firm's life. However, they can also be specialists in one or two industry sectors, or can even attempt to look for investments in only a localized geographic area.

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Venture Factoring

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Venture factoring describes a form of asset-backed lending by venture factoring firms that provides cash to start-up companies by purchasing their accounts receivables (money owed to the company by its customers). By discounting the nominal value of the receivables the firm receives a premium for paying cash for the receivables prior to their maturity.

Venture factoring structures come in various forms. Factoring firms can buy the accounts receivables with or without recourse. Under a factoring structure with recourse the company guarantees the payment of the receivables until maturity. This reduces the risk to the factoring firms and lowers the discount rate at which receivables are bought. This makes raising cash less expensive. Under a nonrecourse structure the company transfers the title of its accounts receivable to the factoring firm.

Generally factoring firms take the responsibility for collecting the accounts receivables directly from the company's debtors. This so-called *notification factoring* can have a negative impact on the company's customer relationships. The transparency is avoided *in non-notification factoring* where the customer keeps paying to the company that in turn passes on the payment to the factoring firm. Depending on the volume and the period of credit, factoring firms can charge a factoring service fee as well as an interest on the amount funded. Combining these costs with the discount rates at which the receivables are financed, venture factoring becomes more expensive than traditional sources of financing.

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Venture Leasing

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Venture leasing, also called *sub-prime leasing*, describes a form of leasing that specialized venture leasing firms offer to start-up companies. Venture-backed companies often

operate in a high growth driven niche environment. Besides normal office equipment and hardware, they usually require custom-made high-tech machinery. With limited sources of financing in the start-up phase, buying such equipment is difficult for most of these companies. Leasing the equipment offers the advantage of not having to raise extra capital and optimizing the use of available cash flows. Traditional leasing, however, is difficult as newer companies often lack the required credit worthiness.

In the absence of material securities, venture leasing companies usually work closely together with venture capital firms. Together they elaborate a leasing structure considering venture capital aspects such as the business model and the market potential of the company.

With its experience the firm is able to expedite the leasing process and provide further assistance to the start-up companies. The firms may, for instance, offer the lessee used office equipment and hardware from their own stock on a reduced cost basis. To compensate for the lack of security, the venture capital lessors generally demand an equity option in the company equal to the risk amount they take. Most venture leasing companies actively market themselves and can be accessed via trade associations or the Internet.

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Venture Philanthropy

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Venture philanthropy is a combination of the two terms philanthropy and venture capital. Other terms often used interchangeably with venture philanthropy are strategic philanthropy, high-engagement philanthropy, effective philanthropy, philanthropic investment, or philanthrocapitalism (Economist, 2006; John, 2006). They all describe a venture capital–like approach to financing social entrepreneurs and social purpose ventures. Although the term was probably first used in 1969 by the American philanthropist John D. Rockefeller III (John, 2006), only in the late 1990s, the first venture philanthropy funds were established. Important for this development was an influential article by Letts et al. (1997) in which the authors tried to answer the question "What Foundations Can Learn from Venture Capitalists." They indirectly criticized foundations for not considering the risk-return trade-off, for financing short term and only new projects, for not giving nonfinancial support, for financing only a small portion of the organizations funding needs, and for not planning and preparing the funded organization for the time after the exit. Venture philanthropy tries to overcome these assumed systematic mistakes in foundations' investment approaches. Just as social entrepreneurs apply commercial approaches to solving social problems,

venture philanthropists apply commercial approaches to financing social purpose ventures. Venture philanthropy thereby mirrors the development of social entrepreneurship on the capital provider side. Although there is no universal definition of venture philanthropy, a few common themes have emerged in the literature (John, 2006; Venture Philanthropy Partners, 2002):

- Funders are highly engaged with the funded organization; in addition to financing, other nonfinancial support such as management expertise and personal networks are also provided.
- Support is provided over an extended period of time.
- Financing is tailored to the need of the organization.
- The goal is to allocate resources efficiently and thereby maximize the social return on investment.
- Performance measurement is important for venture philanthropists.

As a consequence of these characteristics, venture philanthropy funds concentrate on a few organizations and support these with enough financial resources so that the funded organization is able to concentrate on operations. They aim to build capacity instead of financing single new projects. The financial instruments vary from grants, which are the most important ones, to equity. Venture philanthropy funds start early with developing an exit strategy—exit not meaning the sale of an equity stake to another investor but planning for the time after the involvement with the organization funded in order to ensure their further existence. According to this definition, exit may also mean establishing earned income strategies or helping the organization to find a new investor.

Most venture philanthropists have an entrepreneurial or venture capital background and many made their fortunes during the dot.com-boom. With the possibility to spend large amounts for philanthropic causes, they transferred their business approaches to the social sector.

So far, no evidence can be found in the literature that venture philanthropy is a superior approach to financing social organizations. One reason is that venture philanthropy funds are still young, but even more important, since measuring social impact is very difficult, if at all possible, comparing venture philanthropy funds with foundations is much more difficult than comparing two venture capital funds, which easily can be compared by the financial return they achieved.

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Venture Valuation

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Venture valuation refers to the valuation of new ventures, in particular to the valuation of innovative young ventures in the context of a venture capital financing round. The valuation of an investment target supports the investment decision of a venture capitalist. In addition, it helps in negotiating the share of ownership the venture capitalist gets in exchange for the investment sum and other terms of the deal (Smith and Smith, 2004).

Characteristics of innovative start-ups pose special requirements on their valuation. Owing to a business model based on innovations, they usually offer high growth potential. At the same time, they are associated with high business risk as they usually do not yet have a marketable product and they are not yet able to generate positive cash flows. Therefore, classic valuation methods such as the discounted cash flow method or the market approach are difficult to apply to innovative new ventures (Damodaran, 2005). It is difficult to estimate future cash flows of start-ups required for the discounted cash flow method. Sensitivity analysis, scenario analysis, or simulation methods can help to understand and deal with the risk embedded in the forecast of future cash flows (Smith and Smith, 2004). By applying the discounted cash flow method to innovative start-ups, the entrepreneur and the venture capitalist are forced to clearly lay out their perspective on the future growth potential of the company. So even though a detailed cash flow analysis is difficult for new ventures, a discounted cash flow analysis based on projections of key line items can be helpful. This valuation can then support their arguments in the negotiation process prior to closing the deal.

The market approach is difficult to apply to innovative new ventures due to two main reasons. First, the venture usually does not yet generate the required performance indicators such as earnings or sales. Second, comparable companies or comparable transactions often do not exist or their market price is not publicly available. That makes it difficult to create a sensible peer group to calculate an average multiple. However, the market approach is easy to use and mirrors the current market price level. Hence, the value derived from the market approach serves as a good indicator for a market-based price range for the venture (Pratt, 2001).

The real option approach is often seen as a useful extension to classic valuation approaches. Using the real option approach, the benefit of future options of the innovative new venture can be considered. The real option approach can give insights into the strategic options of an innovative start-up on a qualitative level (Koller et al., 2005). However, as it is particularly difficult to estimate the parameters required for a real option valuation (e.g., the value of the underlying asset) a quantitative value is difficult to estimate.

In addition to classic valuation methods, context-specific approaches are often applied in venture capital financing rounds. It is possible to get quick estimates using these context-specific approaches. The venture capital method is an example

of such an approach used for new venture valuation. The value derived from context-specific approaches is likely to be biased as these approaches are mainly based on prior investment experience and on simple rules of thumb. However, for practitioners these approaches can be useful to quickly estimate an approximate value of the new venture (Smith and Smith, 2004).

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VIX

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The volatility index (VIX) is an index of 30-day implied volatility derived from option prices on the S&P 500 index and created by the Chicago Board of Options Exchange (CBOE, 2003). The index reflects future expectations of volatility of the U.S. stock market. From 1993 to 2003, the VIX was constructed using Black-Scholes implied volatilities from options on the S&P 100 index. Since 2003, however, the VIX has been constructed using model-free implied volatility from options on the S&P 500 index (Carr and Wu, 2006).

Among measures of asset price volatility, two types can be distinguished. Historical volatility is estimated using historical asset prices. Implied volatility is estimated from option prices, by equating market prices of options to those obtained with an option-pricing model. Historical volatilities are retrospective estimates, but implied volatilities are prospective estimates because they are estimated from option prices. Hence, many analysts prefer implied volatilities because they reflect future expectations about volatility, rather than past realizations.

Often the Black-Scholes model is used to obtain implied volatility, which creates two problems. The first is that this approach assumes the Black-Scholes model to be the correct one for pricing options. It is well-known, however, that the assumptions underlying the Black-Scholes model are rarely met in practice. The second problem is that Black-Scholes implied volatilities are usually constructed by using options that are near-the-money, and by excluding all deep in-the-money and out-of-the-money options. Hence, all the information embedded in the excluded options is lost. Model-free implied volatility is a recent innovation that uses the entire cross-section of option prices to calculate implied volatility and that is not dependent on a particular parametric model for option prices.

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Volatility

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Volatility has many definitions in finance. The most usual one is the historical volatility, which is the square deviation of returns from their mean, that is

$$\hat{\sigma}_h^2 = \frac{1}{h}\left[\frac{1}{n-1}\sum_{i=1}^{n}\varepsilon_i^2\right]$$

where h is equal to T/n, and n is the number of the continuously compounded returns observed over the period T. ε_{t+h} is equal to $\ln(S_{t+h}/S_t)$. It is assumed that the mean return is equal to 0 because of the shortness of the computation period. This way of computing historical volatility may be compared to two other notions of volatility: realized volatility (realized variance or quadratic variation) and historical volatility. The only difference between historical volatility and realized volatility is the period of computation: daily data for the former and intradaily data for the latter. The concept of realized volatility has a strong link with the pricing of derivatives. It can be shown that

$$\sum_{i=1}^{n}[\sigma Z(i+1) - \sigma Z(i)]^2 \approx \sigma^2(T-t)$$

where $n = (T - t)/h$ and $Z(i) = Z(t + ih)$ is a Brownian motion increment from t to T. The realized quadratic variation provides an estimate of total variance over time (McDonald, 2006). This concept might be related to the expected realized variance, a concept itself related to the VIX. The formula of the expected realized variance, which tells that the variance might be spanned (replicated) by a strip of out-of-the-money puts and calls, is given by

$$\hat{\sigma}^2 = \frac{2e^{rT}}{T}\left[\int_0^{F_{0,T}}\frac{1}{K^2}P(K)dK + \int_{F_{0,T}}^{\infty}\frac{1}{K^2}C(K)dK\right]$$

where K is the strike price and $P(.)$ and $C(.)$ stand, respectively, for observed prices of out-of-the money puts and calls. $F_{0,T}$ is the forward price of the index used to compute the VIX, which is in fact a simple discretization of this formula. This formula is also used by the CBOE for computing the volatility futures contract based on the VIX index. The payoff on the VIX might be given by $1000 \times [\text{VIX}_T - F_{0,T}(V)]$, where V is a volatility measure. Racicot et al. (2008) have used the concept of realized volatility and GARCH processes to forecast volatility that might be used in VaR calculations or in derivatives pricing.

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W

Warehouse Receipt

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A (terminal) warehouse receipt is a receipt issued by a public or terminal warehouse company that certifies the storage of goods. It is a document in which the warehouse company commits to deliver the deposited goods according to the instructions of the holder of the receipt. Warehouse receipt financing is the arrangement of storing inventory to secure a loan and is called terminal warehousing. By taking possession of the warehouse receipt, the lender receives a security interest in the goods that allows him to control the inventory such that the receipt constitutes collateral for a loan (Van Horne and Wachowicz, 2005). Only under the permission of the lender can the warehouse company release the stored goods to the borrower. Ensuring the lender supervision of the inventory, the law provides for the independence of the warehouse company and the company or individual that owns the goods. The warehouse receipt only lists the goods and their lodging but does not guarantee quality, nor does it insure against hazards such as fire (Brealey and Myers, 1996). There are two types of warehouse receipts: negotiable and non-negotiable. In the former, title to the goods can be negotiated by endorsement from one party to another, whereas the non-negotiable receipt underlying most lending arrangements authorizes only one party to release the goods. A field warehouse company might establish a field warehouse on the borrower's premises if the borrower wants to keep the inventory on his premises, the expense of transporting the goods is too high, or the goods are too bulky to be practicably transported. The inventory serving as collateral is physically segregated from the borrower's other inventory and is strictly supervised by the field warehouse company. It issues a field warehouse receipt that the lender holds to secure a loan (Van Horne and Wachowicz, 2005).

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Weather Premium

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The weather (risk) premium is a compensation for calendar-based weather uncertainty. Statistical analysis indicates whether future prices are on average too high, such that shorting the futures contract around the time of weather uncertainty will yield a statistically significant risk premium (a risk premium that exists even after the occurrence of extreme weather losses, such that the risk premium is not subject to a "peso" problem). In other words, long futures investors are willing to pay higher prices in order to hedge a disruption in their supply chain. Examples for the existence of a weather-related risk premium are the coffee risk premium in May/June (fears of cold weather that could damage the coffee crop) or natural gas in July (fears of hot weather, i.e., unusually high demand from the use of air conditioning) as described in Till (2000, 2002). Each of these short futures positions is very risky as there is no diversification in the cross section but only across time, that is, the coffee premium can be statistically reaped only after many "Mays" and hence only makes sense in a diversified commodities program. In any case we talk about an exotic beta, as it is the compensation for passively taking on systematic risks, rather than an active strategy.

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White Label

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White labeling provides companies (like banks, asset manager, or brokers) with the opportunity to offer under their own name complex or specialized products or services of third parties to their customers. The portfolio of products or services increases without a comparable increase in workforce or technology. Therefore, it can be considered akin to outsourcing (Samii, 2004). Few financial companies can offer all kinds of services and products to all their customers. Managed futures are one type of alternative investments and they need experience, workforce, technology, and a certain amount of assets under management to be profitable. When single requirements cannot be fulfilled, white labeling of products from experienced and successful investment managers can help to offer a broader product range to customers and increase the turnover through fees. The initial investment manager can increase the client base and the assets under management, and

thereby the management and potentially incentive fees. For all participants the counterparts risk increases.

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Samii, M. (2004) *International Business and Information Technology: Interaction and Transformation in the Global Economy*. Routledge, London, UK.

Withdrawn Offering

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A withdrawn offering is an initial public offering (IPO) that was scheduled for particular offering date and then subsequently withdrawn from the market such that it is not sold on that date (Ritter, 1998). Companies may go public in the United States under either a firm commitment or best efforts contract with an investment bank. Under a firm commitment contract, a preliminary prospectus is issued with a price range for the offering for the road show to solicit investors' interest in the offering. If the company and its investment bank determine that the market conditions are such that the company will not sell at a price that is acceptable to the company then the offer will be withdrawn until the market conditions improve. Under a best efforts contract, the company going public and its investment bank agree to the minimum and maximum number of shares to be sold at a specified price and during a specified selling period, usually 90 days. The investment bank makes best efforts to sell the shares during the specified selling period. If the minimum number of shares is not sold during the specified selling period then the offer is withdrawn and all the money of the investors is reimbursed from an escrow account, with the issuing firm receiving no money. IPOs raising an amount greater than $10 million almost always use firm commitment contracts, whereas best efforts contracts are used by more speculative smaller IPOs.

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Ritter, J. (1998) Initial public offerings. In: D. Logue and J. Seward (Eds.), *Warren, Gorham, and Lamont Handbook of Modern Finance*. WGL/RIA, Boston and New York.

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