

COMMODITY MARKET TRADING and INVESTMENT

*A Practitioners Guide
to the Markets*

TOM JAMES

GLOBAL FINANCIAL MARKETS

Global Financial Markets

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Tom James

Commodity Market Trading and Investment

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I would like to dedicate this book to all my family and friends around the world and I would like to give a special thanks to all the people who during my long career have provided me with the opportunities to develop and offered me the guidance and mentoring to support that development.

I now hope that through my publications I can succeed in passing on my collected experience and help to support others in their development and career growth.

Preface

Increased competition for natural resources is one of the inevitable consequences of globalization. Previously, this has manifested itself mainly in terms of energy security, though in recent years a succession of poor harvests among key producers has even brought volatility and higher underlying prices to global food markets as well.

The problems inherent in tight supply markets have on occasion been exaggerated further by government actions intended to protect their own national resource security. What is different about resource competition in the twenty-first century is its global nature and the speed with which it is intensifying. Price volatility has become the new “normal” situation across energy and other commodity markets. This volatility presents challenges for the markets and opportunities for investors and traders. These opportunities and challenges encouraged me as a commodity market professional to author this book to help investors explore the world of commodity market investment and trading.

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1

Setting the Scene

Commodities are the world's raw materials. As natural resources, they are used in the production process of all manufactured goods, putting them at the heart of the economic cycle. The vital role in the world's economy, combined with the specific characteristics of commodity markets, make this an asset class that can add real value to your investment portfolio.

Commodities are materials in every product we use: the grains in our food, the wooden table on which that food is served, the steel in the car outside the restaurant. There are many different commodities and many different commodity classifications. From non-perishable or “hard” commodities, such as metals like copper, lead, and tin, to perishable “soft” commodities, such as agricultural products, coffee, cocoa, and sugar.

Trends in resource prices have changed abruptly and decisively since the turn of the century. During the twentieth century, resource prices fell by a little over a half per cent a year on average. But since 2000, average resource prices have more than doubled. Over the past 15 years, the average annual volatility of these prices has been almost three times what it was in the 1990s.

This new era of high, rising, and volatile resource prices has been characterized by many observers as a resource price “super-cycle”. Since 2011, commodity prices have eased back a little from their peaks, prompting some to question whether the super-cycle has finally come to an end. But the fact is that, despite recent declines, on average commodity prices are still almost at their levels in 2006–2008 when the global financial crisis was building up.

International crude oil prices used to trade in the range of US\$9–\$40 dollars from 1988 to 2004; since then we have seen US\$30–148. Even since

the 2008 crash and peak in commodity financial contracts called “futures” US\$125 has been tested several times.

Commodity futures are financial contracts on regulated markets around the world that allow investors to trade directly the wholesale price of a huge variety of everyday commodities. These futures contracts are still a relatively unknown asset class, despite being traded around the world for many hundreds of years. This may be because commodity futures are strikingly different from stocks, bonds, and other conventional assets, plus, historically, the controls around marketing them to the general public have been very strict as they tended to be much more volatile than other investment products and were therefore aimed at high net worth investors and professional traders. Among these differences are:

- (1) commodity futures are derivative securities: they are not claims on long-lived corporations;
- (2) they are short maturity claims on real assets;
- (3) unlike financial assets, many commodities have pronounced seasonality in price levels and volatilities.

The economic function of corporate securities such as stocks and bonds, that is, liabilities of firms, is to raise external resources for the firm. Investors are bearing the risk that the future cash flows of the firm may be low and may occur during bad times, like recessions. These claims represent the discounted value of cash flows over very long horizons. Their value depends on decisions of management. Investors are compensated for these risks. Commodity futures are quite different: they do not raise resources for firms to invest. Rather, commodity futures allow firms to obtain insurance for the future value of their outputs (or inputs). Investors in commodity futures receive compensation for bearing the risk of short-term commodity price fluctuations.

Commodity futures do not represent direct exposures to actual commodities. Futures prices represent bets on the expected future spot price. Inventory decisions link the current and future scarcity of the commodity and consequently provide a connection between the spot price and the expected future spot price. But commodities, and hence commodity futures, display many differences. Some commodities are storable and some are not; some are input goods and some are intermediate goods.

World commodities can be broken down into six core categories (see Table 1.1).

Commodities are clearly crucial to everyone’s daily life. Without food, we cannot eat. Without energy many aspects of developed society cease to func-

Table 1.1 The Six core categories of world commodities

Categories	Typical examples
Energy	Crude oil, natural gas, gasoline, power
Precious metals	Gold, silver, platinum, palladium
Base metals	Aluminium, copper, nickel
Ferrous metal	Steel, iron ore
Agricultural	Wheat, coffee, cocoa, sugar
Livestock	Feeder cattle, live cattle, lean hogs

tion. This fundamental role of natural resources is a strong driver of demand for commodities: a demand that will only intensify with the world's growing population, increasing urbanization, and rising living standards, trends to which emerging markets like China are contributing heavily.

As producers, such as mining and oil companies or large-scale farms, try to meet this growing demand, their output relies on the availability of and their access to the relevant commodities. A variety of factors play an important role here, including weather conditions and regulations, as well as the geopolitical environment, as seen for example in 2011 when unrest in oil-producing countries affected oil prices (e.g. the Libyan crisis).

In recent years, investible commodity indices and commodity linked assets have increased the number of available commodity based products. Alongside this a fast growing commodity-related hedge fund industry, commonly referred to as alternative investments, has enabled investors to gain access to a variety of interesting new commodity markets and strategies.

Historically, commodities like precious metals have always been valued by people as important possessions, often as jewellery. Today, private investors are increasingly keen to own commodities alongside their investment portfolio.

The main reasons for this trend are:

- commodities offer diversification within the overall investment portfolio;
- the fundamental link between the economic cycle, commodities, and inflation means investing in real assets offers some protection from inflation;
- commodities can from time to time offer considerable returns, though prices are volatile.

Despite these advantages, investors need to be careful, as investing in commodities also carries considerable risks due to the volatility in commodity returns being generally on the high side: adverse market circumstances can result in losses. In addition, the historical fundamental characteristics and mechanics of commodity markets can evaporate quickly in times of market

stress, for example the correlation with other asset classes, normally low, may increase in times of crisis, as witnessed in the fourth quarter of the 2008 crash in all financial markets, commodities, and equity indexes like the S&P for example correlated closely together and for some period of time after the crash. The other risk area that has to be monitored is liquidity in the volume of the commodity market you are investing or trading in as the market for some individual commodities is not large.

Despite some perceived higher risk in the volatility of commodity markets, direct commodity investment can provide significant portfolio diversification benefits beyond those achievable using commodity based stock and bond investments. These benefits stem from the unique exposure of commodities to market forces, such as unexpected inflation as well as the potential of a positive roll return in futures based commodity investment in periods of high spot price volatility. Adding a commodity component to a diversified portfolio of assets has been demonstrated to show enhanced risk adjusted performance for investors.

Investing and Trading via Derivatives Contracts in Commodities

A commodity futures contract is an agreement to buy (or sell) a specified quantity of a commodity at a future date, at a price agreed upon when entering into the contract—the futures price. The futures price is different from the value of a futures contract. Upon entering a futures contract, no cash changes hands between buyers and sellers—and hence the value of the contract is zero at its inception. How then is the futures price determined?

The alternative to obtaining the commodity in the future is simply to wait and purchase it in the future spot market. Because the future spot price is unknown today, a futures contract is a way to lock in the terms of trade for future transactions. In determining the fair futures price, market participants will compare the current futures price to the spot price that can be expected to prevail at the maturity of the futures contract.

In other words, futures markets are forward looking and the futures price will embed expectations about the future spot price. If spot prices are expected to be much higher at the maturity of the futures contract than they are today, the current futures price will be set at a high level relative to the current spot price. Lower expected spot prices in the future will be reflected in a low current futures price.

Because foreseeable trends in spot markets are taken into account when the futures prices are set, expected movements in the spot price are not a source of return to an investor in futures. Futures investors who buy a futures contract will benefit when the spot price at maturity turns out to be higher than expected when they entered into the contract, and they will lose when the spot price is lower than anticipated. A futures contract is therefore a bet on the future spot price, and by entering into a futures contract an investor assumes the risk of unexpected movements in the future spot price. The interesting angle for futures trading in commodities though is that an investor can first sell a contract and effectively short the market and profit from a decrease in prices and buy back the contract at a lower price and lock in the profit. This ability to short the market means that investors can profit from both upward and downward price movements, beating the just-buy-it-and-hold commodity return scenario. The historical and future drivers in energy, metals, and agriculture (food and raw materials) vary as follows.

Energy Prior to the 1970s, real energy prices (including those of coal, gas, and oil) were largely flat as supply and demand increased in line with each other. During this period, there were discoveries of new, low-cost sources of supply, energy producers had weak pricing power, and there were improvements in the efficiency of the conversion of energy sources in their raw state to their usable form.

This flat trend was interrupted by major supply shocks in the 1970s when real oil prices increased sevenfold in response to the Yom Kippur War and the subsequent oil embargo by the Organization of Arab Petroleum Exporting Countries. But after the 1970s, energy prices entered into a long downward trend due to a combination of substituting electricity generation for oil in Organisation for Economic Co-operation and Development (OECD) countries, the discovery of low-cost deposits, a weakening in the bargaining power of producers, a decline in demand after the break-up of the Soviet Union, and subsidies. However, since 2000, energy prices (in nominal terms) have increased by 260 %, due primarily to the rising cost of supply and the rapid expansion in demand in non-OECD countries.

In the future, strong demand from emerging markets, more challenging sources of supply, technological improvements, and the incorporation of environmental costs will all shape the evolution of prices. The role of gas in the energy index is important to note. Gas represents just over 12 % of the energy index. There has also been significant regional divergence in global gas prices, as we will see later.

Metals Overall, real metals prices fell by 0.2 % (an increase of 2.2 % in nominal terms) a year during the twentieth century. However, there was some variation among different mineral resources. Steel prices were flat, but real aluminium prices declined by 1.6 % (an increase of 0.8 % in nominal terms) a year. The main drivers of price trends over the last century included technology improvements, the discovery of new, low-cost deposits, and shifts in demand. However, since 2000, metals prices (in nominal terms) have increased by 176 % on average (8 % annually). Gold, amongst the major metals, has increased the most, driven predominantly by investors' perceptions that it represented a safe asset class during the volatility of the financial crisis, rising production costs, and limited new discoveries of high-grade deposits.

Copper and steel prices (in nominal terms) have increased by 344 % and 167 %, respectively, since the turn of the century, even taking into account recent price falls. Many observers of these price increases have pointed to demand from emerging markets such as China as the main driver.

Agriculture Food prices (in real terms) fell by an average of 0.7 % (an increase of 1.7 % in nominal terms) a year during the twentieth century despite a significant increase in food demand. This was because of rapid increases in yield per hectare due to the greater use of fertilizers and capital equipment, and the diffusion of improved farming technologies and practices.

However, since 2000, food prices (in nominal terms) have risen by almost 120 % (6.1 % annually) due to a declining pace of yield increases, rising demand for feed and fuel, supply-side shocks (due to droughts, floods, and variable temperatures), declines in global buffer stocks, and policy responses (e.g., governments in major agricultural regions banning exports). Non-food agricultural commodity nominal prices—including timber, cotton, and tobacco—have risen by between 30 and 70 % since 2000.

Rubber prices have increased by more than 350 % because supply has been constrained at a time when demand from emerging economies for vehicle tyres has been surging. In the future, agricultural markets will be shaped by demand from large emerging countries such as China, climate and ecosystem risks, urban expansion into arable land, biofuels demand, and the potential for further productivity improvements.

2

Investment and Trading in Commodity Markets

The Evolution of Commodity Markets

Commodity investment and trading is not new, though commodity-based money and commodity markets in a crude early form are believed to have originated in [Sumer](#) between 4500 and 4000 BC. Sumerians first used [clay](#) tokens sealed in a clay vessel, then clay writing tablets to represent the amount—for example, the number of goats—to be delivered. These promises of time and date of delivery resemble [futures contracts](#). Early civilizations variously used pigs, rare seashells, or other items as [commodity money](#). Since that time traders have sought ways to simplify and standardize trade contracts.

Gold and silver markets evolved in classical civilizations. At first the precious metals were valued for their beauty and intrinsic worth and were associated with royalty. In time, they were used for trading and were exchanged for other goods and commodities, or for payments of labour. Gold, measured out, then became money. Its scarcity, unique density, and the way it could be easily melted, shaped, and measured made it a natural trading asset.

Beginning in the late tenth century, commodity markets grew as a mechanism for allocating goods, labour, land, and capital across Europe. Between the late eleventh and the late thirteenth century, English urbanization, regional specialization, expanded and improved infrastructure, the increased use of coinage, and the proliferation of markets and fairs were evidence of commercialization. The spread of markets is illustrated by the 1466 installation of reliable scales in the Dutch villages of Sloten and Osdorp so villagers no longer

had to travel to Haarlem or Amsterdam to weigh their locally produced cheese and butter.

In 1864, in the USA, wheat, corn, cattle, and pigs were widely traded using standard instruments on the [Chicago Board of Trade](#) (CBOT), the world's oldest futures and options exchange. Other food commodities were added to the [Commodity Exchange Act](#) and traded through CBOT in the 1930s and 1940s, expanding the list from grains to include rice, mill feeds, butter, eggs, Irish potatoes, and soybeans. Successful commodity markets require broad consensus on product variations to make each commodity acceptable for trading, such as the purity of gold in bullion. Classical civilizations built complex global markets trading gold or silver for spices, cloth, wood, and weapons, most of which had standards of quality and timeliness.

Reputation and clearing became central concerns, and states that could handle them most effectively developed powerful financial centres.

The Meaning of Commodity Markets

“Commodity market” refers to the physical or virtual market place for buying, selling, and trading raw or primary products. Commodities are split into two types: hard and soft. Hard commodities are typically natural resources that must be mined or extracted (e.g., gold, rubber, oil), whereas soft commodities are agricultural products or livestock (e.g., corn, wheat, coffee, sugar, soybeans, pork). Investors access about 50 major commodity markets worldwide with purely financial transactions increasingly outnumbering physical trades in which goods are delivered. [Futures contracts](#) are the oldest way of investing in commodities. Futures are secured by physical assets. Commodity markets can include physical trading and derivatives trading using [spot prices](#), [forwards](#), [futures](#), and [options](#) on futures. Farmers have used a simple form of derivative trading in the commodity market for centuries for price risk management.

There are numerous ways to invest in commodities. An investor can purchase stock in corporations whose business relies on commodities prices, or purchase mutual funds, index funds, or exchange-traded funds (ETFs) that have a focus on commodities-related companies. The most direct way of investing in commodities is by buying into a futures contract.

A [financial derivative](#) is a financial instrument whose value is derived from a commodity termed an “[underlier](#)”. Derivatives are either [exchange-traded](#) or [over-the-counter](#) (OTC). An increasing number of derivatives are traded

via [clearing houses](#), some with [central counterparty clearing](#), which provide clearing and settlement services on a futures exchange, as well as off-exchange in the OTC market.

Derivatives such as futures contracts, [swaps](#) (from the 1970s), exchange-traded commodities (ETCs) (from 2003), and forward contracts have become the primary trading instruments in commodity markets. Futures are traded on regulated [commodities exchanges](#). OTC contracts are privately negotiated bilateral contracts entered into between the contracting parties directly.

ETFs began to feature in commodities in 2003. Gold ETFs are based on “electronic gold” that does not entail the ownership of physical bullion, with its added costs of insurance and storage in repositories such as the [London Bullion Market](#). According to the [World Gold Council](#), ETFs allow investors to be exposed to the gold market without the risk of price [volatility](#) associated with gold as a physical commodity.

Commodity Price Index

In 1934 the US [Bureau of Labor Statistics](#) began the computation of a daily [commodity price index](#) that became available to the public in 1940. By 1952 the Bureau issued a [spot market price index](#) that measured the price movements of key sensitive basic commodities whose markets are presumed to be among the first to be influenced by changes in economic conditions. It was one of the earliest Commodity related economic indexes that could give an indication of impending changes in business activity.

Commodity Index Fund

A [commodity index fund](#) is one whose assets are invested in financial instruments based on or linked to a commodity index. In just about every case the index is in fact a commodity futures index. The first such index was the Commodity Research Bureau (CRB) Index, which began in 1958. However, its construction was not useful as an investment index. The first practically investable commodity futures index was the [Goldman Sachs Commodity Index](#), created in 1991, and known as the “GSCI”. The next was the Dow Jones American Insurance Group (AIG) Commodity Index (DJ AIG), which differed from the GSCI primarily by the weights allocated to each commodity. The DJ AIG had mechanisms to limit periodically the weight of any one commodity and to remove

commodities whose weights became too small. After [AIG](#)'s financial problems in 2008 the Index rights were sold to [UBS](#), and it is now known as the DJUBS index. Other commodity indices include the Reuters/CRB Index (which is the old CRB Index as restructured in 2005) and the Rogers Index.

Cash Commodities

Cash commodities or cash market refer to the physical goods (e.g., wheat, corn, soybeans, crude oil, gold, silver) that someone is buying/selling/trading as distinguished from derivatives.

Call Options

In a [call option counterparties](#) enter into a financial contract option where the buyer purchases the right but not the obligation to buy an agreed quantity of a particular commodity or financial instrument (the underlying) from the seller of the option at a certain time (the expiration date) for a certain price (the [strike price](#)). The seller (or "writer") is obligated to sell the commodity or financial instrument should the buyer so decide. The buyer pays a fee (called a premium) for this right.

Commodity Trading

Commodity trading is defined as an [investing strategy](#) wherein [goods](#) are traded instead of [stocks](#). [Commodities](#) traded are often goods of [value](#), consistent in [quality](#), and produced in large [volumes](#) by different [suppliers](#), such as wheat, coffee, and sugar. [Trading](#) is affected by [supply and demand](#), thus a limited [supply](#) causes a [price increase](#) while [excess supply](#) causes a price decrease.

Contracts in the Commodity Market

Spot Contracts

A [spot contract](#) is an agreement where delivery and payment either takes place immediately or with a short time lag. Physical trading normally involves a visual inspection and is carried out in physical [markets](#) such as a [farm-](#)

ers' market. Derivatives markets, on the other hand, require the existence of agreed standards so that trades can be made without visual inspection.

Forward Contracts

A **forward contract** is an agreement between two parties to exchange at some fixed future date a given quantity of a commodity for a price defined when the contract is finalized. The fixed price is known as the **forward price**. Such forward contracts began as a way of reducing pricing risk in food and agricultural product markets, so that farmers would know what price they would receive for their output. They were used, for example, for rice in seventeenth-century Japan.

Futures Contracts

Futures contracts are standardized forward contracts that are transacted through an exchange. In futures contracts the buyer and the seller stipulate the product, grade, quantity, and location, leaving the price as the only variable.

Agricultural futures contracts are the oldest and have been in use in the USA for more than 170 years. Modern futures agreements began in Chicago in the 1840s, with the appearance of the railways. Chicago, centrally located, emerged as the hub between Midwestern farmers and east coast consumer population centres.

Hedges

Hedging, a common practice of farming cooperatives, insures against a poor harvest by purchasing **futures contracts** in the same commodity. If the cooperative has significantly less of its product to sell due to weather or insects, it makes up for that loss with a profit on the markets, assuming that the overall supply of the crop is short everywhere that suffered the same conditions.

Swaps

A **Swap** is a derivative in which counterparts exchange the cash flows of one party's financial instrument for those of the other party's financial instrument. They were introduced in the 1970s.

ETCs

ETC funds are investment vehicles (generally, fully collateralized asset backed bonds) that track the performance of an underlying commodity index, including total return indices based on a single commodity. They are similar to ETFs and are traded and settled exactly like stock funds. ETCs have [market maker](#) support with guaranteed liquidity, enabling easy investment in commodities.

Introduced in 2003, at first only professional institutional investors had access, though online exchanges opened some ETC markets to almost anyone. ETCs were introduced partly in response to the tight supply of commodities in 2000, combined with record low inventories and increasing demand from emerging markets such as China and India.

Prior to the introduction of ETCs, by the 1990s ETFs pioneered by [Barclays Global Investors](#) (BGI) revolutionized the mutual funds industry. By the end of December 2009 BGI assets hit an all-time high of \$1 trillion.

Gold was the first commodity to be securitized through an ETF in the early 1990s, but it was not available for trade until 2003. The idea of a gold ETF was first officially conceptualized by the [Benchmark Asset Management Company Private Ltd](#) in India, when they filed a proposal with [SEBI](#) in May 2002. The first gold exchange-traded fund was [Gold Bullion Securities](#) launched on the Australian Stock Exchange (ASX) in 2003, and the first [silver exchange-traded fund](#) was [iShares Silver Trust](#) launched on the New York Stock Exchange (NYSE) in 2006. As of November 2010, a commodity ETF, namely [SPDR Gold Shares](#), was the second-largest ETF by market capitalization.

Generally commodity ETFs are index funds tracking non-security [indices](#). Because they do not invest in securities, commodity ETFs are not regulated as investment companies under the [Investment Company Act of 1940](#) in the USA, although their public offering is subject to SEC review and they need an Securities Exchange Commission (SEC) [no-action letter](#) under the [Securities Exchange Act of 1934](#). They may, however, be subject to regulation by the [Commodity Futures Trading Commission](#).

The earliest commodity ETFs, such as “[SPDR Gold Shares NYSE Arca: GLD](#)” and “[iShares Silver Trust NYSE Arca: SLV](#)”, actually owned the physical commodity (e.g., gold and silver bars). Similar to these are “[NYSE Arca: PALL](#) (palladium)” and “[NYSE Arca: PPLT](#) (platinum)”. However, most ETCs implement a [futures trading](#) strategy, which may produce quite different results from owning the commodity.

Commodity ETF trade provides exposure to an increasing range of commodities and commodity indices, including energy, metals, [softs](#), and agriculture. Many commodity funds, such as oil, roll so-called front-month futures contracts from month to month. This provides exposure to the com-

modity, but subjects the investor to risks involved in different prices along the *term structure*, such as a high cost to roll. The “roll” or the process of “rolling” is whereby funds invest usually in the spot futures contracts and before expiry (since they don't wish to take delivery of the underlying physical commodity) will have to close out their futures position in the expiring spot contract (this month's) and buy the next month's contract. Every time a fund does this of course they must pay some brokerage commission and exchange fees.

ETCs in China and India gained in importance due to those countries' emergence as commodities consumers and producers. China accounted for more than 60 % of exchange-traded commodities in 2009, up from 40 % the previous year. The global volume of ETCs increased by 20 % in 2010, and has increased 50 % since 2008, to around 2.5 billion contracts.

OTC Commodities Derivatives

OTC commodities derivatives trading originally involved two parties, without an [exchange](#). Exchange trading offers greater transparency and regulatory protections. In an OTC trade, the price is not generally made public. OTCs are higher risk but may also lead to higher profits.

Between 2007 and 2010, global physical exports of commodities fell by 2 %, while the outstanding value of OTC commodities derivatives declined by two-thirds as investors reduced risk following a five-fold increase in the previous three years.

Money under management more than doubled between 2008 and 2010 to nearly \$380 billion. Inflows into the sector totalled over \$60 billion in 2010, the second highest year on record, down from \$72 billion the previous year. The bulk of funds went into precious metals and energy products. The growth in prices of many commodities in 2010 contributed to the increase in the value of commodities funds under management.

Energy

Energy commodities include [crude oil](#), particularly [West Texas Intermediate crude oil](#) and [Brent crude oil](#), [natural gas](#), [heating oil](#), [ethanol](#), and [purified terephthalic acid](#) (PTA). [Hedging](#) is a common practice for these commodities.

Crude Oil and Natural Gas

For many years (WTI) crude oil, a [light, sweet crude oil](#), was the world's most-traded commodity. WTI or West Texas Intermediate Crude Oil is a

grade used as a [benchmark in oil pricing](#). It is the [underlying commodity](#) of the Chicago Mercantile Exchange's oil futures contracts. WTI is often referenced in news reports on oil prices, alongside Brent. It is lighter and sweeter than Brent and considerably lighter and sweeter than Dubai or Oman. From April through to October 2012 Brent futures contracts exceeded those for WTI, the longest streak since at least 1995.

Crude oil can be light or [heavy](#). Oil was the first form of energy to be widely traded. Some commodity market speculation is directly related to the stability of certain states, for example [Iraq](#), [Bahrain](#), [Iran](#), [Venezuela](#), and many others. Most commodities markets are not so tied to the politics of volatile regions.

Oil and gasoline are traded in units of 1000 barrels (42,000 US gallons.) WTI crude oil is traded through [NYMEX](#) under the [trading symbol](#) CL and through [Intercontinental Exchange](#) (ICE) under the trading symbol WTI (West Texas Intermediate Crude Oil). Brent crude oil is traded through ICE under the symbol LCO. [Gulf Coast Gasoline](#) is traded through NYMEX under the symbol LR. [Gasoline](#) (reformulated gasoline blend stock for oxygen blending or RBOB) is traded through NYMEX under the symbol RB.

Natural gas is traded through NYMEX in units of 10,000 MMBtu under the trading symbol of NG. [Heating oil](#) is traded through NYMEX under the symbol HO.

Others

PTA is traded through the Zhengzhou Commodity Exchange in units of five tons under the trading symbol of TA. [Ethanol](#) is traded at [CBOT](#) in units of 29,000 US gallons under trading symbols AC (open auction) and ZE (electronic).

Metals

Precious Metals

Precious metals currently traded on the commodity market include gold, platinum, palladium, and silver, which are sold by the troy ounce. One of the main exchanges for these precious metals is COMEX.

According to the [World Gold Council](#), investments in gold are the primary driver of industry growth. Gold prices are highly volatile, driven by large flows of speculative money.

Industrial Metals

Industrial metals are sold by the metric ton through the London Metal Exchange and New York Metal Exchange. The London Metal Exchange trades include copper, aluminium, lead, tin, aluminium alloy, nickel, cobalt, and molybdenum. The Rotterdam Metal Exchange trades recycled steel. In 2007, steel began trading on the London Metal Exchange.

Agriculture

Agricultural commodities include grains, food, and fibre as well as livestock and meat; various regulatory bodies define agricultural products.

On July 21, 2010, the US Congress passed the Dodd–Frank Wall Street Reform and Consumer Protection Act with changes to the definition of “agricultural commodity”. The operational definition used by Dodd–Frank includes “all other commodities that are, or once were, or are derived from, living organisms, including plant, animal and aquatic life, which are generally fungible, within their respective classes, and are used primarily for human food, shelter, animal feed, or natural fiber”. Three other categories were explained and listed.

In February 2013, Cornell Law School included lumber, soybeans, oilseeds, livestock (live cattle and hogs), and dairy products. Agricultural commodities can include lumber (timber and forests), grains excluding stored grain (wheat, oats, barley, rye, grain sorghum, cotton, flax, forage, tame hay, native grass), vegetables (potatoes, tomatoes, sweetcorn, dry beans, dry peas, freezing and canning peas), fruit (citrus such as oranges, apples, grapes) corn, tobacco, rice, peanuts, sugar beets, sugar cane, sunflowers, raisins, nursery crops, nuts, soybean complex, aquacultural fish farm species (such as finfish, mollusc, crustacean, aquatic invertebrate, amphibian, reptile, or plant life cultivated in aquatic plant farms).

In 1900 corn acreage was double that of wheat in the USA. But from the 1930s through the 1970s, soybean acreage surpassed corn. Early in the 1970s grain and soybean prices, which had been relatively stable, “soared to levels that were unimaginable at the time”. There were a number of factors affecting prices including the surge in crude oil prices caused by the Arab Oil Embargo in October 1973 (US inflation reached 11 % in 1975).

Diamonds

As of 2012 diamonds were not traded as a commodity. Institutional investors were repelled by the campaign against “[blood diamonds](#)”, the monopoly structure of the diamond market, and the lack of uniform standards for diamond pricing. In 2012 the SEC reviewed a proposal to create the first diamond-backed exchange-traded fund that would trade online in units of one-carat diamonds with a storage vault and delivery point in Antwerp, the home of the [Antwerp Diamond Bourse](#). The exchange fund was backed by a company based in [New York](#) called [Index IQ](#), which had already introduced 14 exchange-traded funds since 2008.

According to [Citigroup](#) analysts, the annual production of polished diamonds is about \$18 billion. Like gold, diamonds are easily authenticated and durable. Diamond prices have been more stable than metals, as the global diamond monopoly [De Beers](#) once held almost 90 % (by 2013 reduced to 40 %) of the new market.

Other Commodity Markets

Rubber trades on the [Singapore Commodity Exchange](#) in units of 1 kg, priced in US cents. [Palm oil](#) is traded on the [Malaysian Ringgit](#), [Bursa Malaysia](#) in units of 1 kg, priced in US cents. Wool is traded on the [ASX \(Australian Stock Exchange\)](#) in [Australian Dollars AUD](#), in units of 1 kg. Polypropylene and linear low density polyethylene trade on the London Metal Exchange in units of 1000 kg, priced in US dollars.

Regulatory Bodies and Policies

USA

In the USA, the principal regulator of the commodity and futures markets is the [Commodity Futures Trading Commission \(CFTC\)](#). The [National Futures Association \(NFA\)](#) formed in 1976 is the futures industry’s self-regulatory organization. The NFA’s first regulatory operations began in 1982 and fall under the [Commodity Exchange Act](#) of the [CFTC Act](#).

Dodd–Frank was enacted in response to the 2008 financial crisis and called for “strong measures to limit speculation in agricultural commodities” requiring the CFTC to limit positions further and to regulate OTC trades.

European Union

The [Markets in Financial Instruments Directive](#) (MiFID) is the cornerstone of the [European Commission's Financial Services Action Plan](#) that regulates operations of the EU financial service markets. It was reviewed in 2012 by the [European Parliament](#) (EP) and the [Economic and Financial Affairs Council](#). The EP adopted a revised version of MiFID II on October 26, 2012 which includes “provisions for position limits on commodity derivatives”, aimed at “preventing market abuse” and supporting “orderly pricing and settlement conditions”.

The [European Securities and Markets Authority](#), based in Paris and formed in 2011, is an “EU-wide financial markets watchdog” and sets position limits on commodity derivatives as described in MiFID II.

The European Parliament voted in favour of stronger regulation of commodity derivative markets in September 2012 to “end abusive speculation in commodity markets” that were “driving global food price increases and price volatility”. In July 2012 “food prices globally soared by 10 percent” ([World Bank](#) 2012). Senior British MEP Arlene McCarthy called for “putting a brake on excessive food speculation and speculating giants profiting from hunger” to end immoral practices that “only serve the interests of profiteers”. In March 2012, EP Member Markus Ferber suggested amendments to the European Commission's proposals that were intended to strengthen restrictions on [high-frequency trading](#) and commodity price manipulation.

3

The Financial Commodity Markets

Futures and options on commodities have seen phenomenal growth in trading volume in recent years, due to increased global demand and expanded availability of electronic trading in these products. It is more important than ever to understand how to incorporate these tools into the management of risk. The demand has also been fuelled by the attraction of volatility in these markets and the opportunity for much stronger non-equity correlated returns. The average percentage of funds invested in commodities by pension schemes, for example, has increased from around 2 %, as an inflation hedge, to 10–15 % of assets under management these days.

Global Commodity Markets: Price Volatility

The past decade has witnessed a large increase in the prices of many commodities, despite significant falls during the global financial crisis. These increases have raised a number of concerns for policymakers, including the potential for rising commodity prices to feed into broader domestic inflationary pressures, with some developing nations particularly concerned about rising food prices. The G-20 has committed itself to work to address excessive commodity price volatility, with a focus on the role played by the growing presence of financial investors in commodity markets. While speculators are present in commodity markets they do not appear to have contributed significantly to the level or volatility of prices except in the very short term. At this stage, the

available evidence suggests that fundamental factors are the main determinants of commodity prices.

The substantial increase in commodity prices over the past decade has been supported by a number of fundamental drivers. One of the most significant has been the shift in the composition of global growth over this period as emerging market economies—particularly China—have come to prominence as the engines of world growth. Since these emerging market economies are generally at a relatively commodity-intensive stage of development, there has been a corresponding shift in global demand towards commodities as these countries become industrialized and expand their infrastructure.

Food prices have also been affected by economic development, with the composition and volume of food intake changing as per capita income in these economies rises, generally resulting in a shift away from grains towards higher protein foods such as livestock and dairy, which have high resource footprints. This has been very clear in Asia where diets have changed significantly over the past 20 years.

These trends are likely to continue for some time. Simultaneously, supply has struggled to keep pace with the unexpectedly rapid rise in emerging market demand over the past decade. Relatively low and falling real commodity prices throughout the 1980s and 1990s resulted in low levels of investment in production capacity for some commodities. Given the long lead time to bring new production online for many commodities, accidents and natural disasters have periodically reduced output at mines, including for copper and coal in recent years.

Commodity Price Volatility

The recent increase in the level of commodity prices has been accompanied by a significant rise in their volatility. While price signals play an important role in boosting future supply and allocating existing supply, volatility in prices can hinder this process by generating uncertainty about future price levels.

Shorter-term volatility is not inconsequential either, as it can cause disruption within financial markets, such as the time to undertake mineral exploration and subsequently build a new mine—prices have increased substantially in order to clear the market, prompting a pick-up in investment. Weather-related disturbances—droughts, floods, tropical cyclones—in some key producer countries have also boosted the prices of a number of agricultural commodities over recent years. The imposition of export bans (often in response to food security concerns) has further contributed to global supply shortages of some food stocks and minerals, such as iron ore,

at times. In addition, the recent increase in commodity price volatility raises two related questions. How does commodity price volatility typically compare to that of other financial market prices? And how unusual is the current level of commodity price volatility?

Starting with the first question, commodity prices do tend to be more volatile than many other prices in the economy because in the short term both global supply and demand for commodities are relatively price inelastic, for example increasing the level of production takes time if new crops must be grown, mineral exploration undertaken, or new mines built.

Similarly, it can take considerable time to change consumption habits, such as shifting from coal-fired electricity generation to gas, or altering the share of more fuel efficient cars in the outstanding stock of automobiles. This sluggish response means that supply and demand shocks, due to weather events or natural disasters for example, can result in large price movements in order to clear the market.

Financial Investment in Commodities

It has been suggested that, in addition to fundamental supply and demand factors, the activity of speculators in financial markets may have played a significant role in contributing to the increase in the level and volatility of some commodity prices in recent years. This section describes the growing presence of financial investors in commodity derivative markets, while the next section examines the evidence of the effect of this growth on observed commodity price dynamics over the past decade. Financial markets provide a useful complement to physical commodity markets because they allow consumers and producers to hedge their exposures to movements in commodity prices. These markets exist precisely because prices can be volatile; they allow uncertainty about future price movements to be managed. For example, a farmer could purchase a forward contract at the time of planting a crop to provide certainty about the price that will be received at harvest time.

Financial investors provide additional liquidity to these markets and can improve price discovery. In theory, there should be a relationship between futures prices and spot prices determined by the cost of transportation. This is the opportunity cost of buying and holding a good or financial instrument versus purchasing a futures contract for delivery in the future. In the case of commodities, holding a physical commodity can incur large storage costs, complicating the ability of arbitrage to maintain the relationship. To the extent that such a relationship does hold, any increase in volatility in futures markets could lead to greater volatility in the spot market.

However, the relationship also means that if supply and demand factors underpin the spot price, the futures price will be unable to deviate significantly from this fundamental price for an extended period of time. Over the past decade, regulatory changes and the development of new financial products have allowed financial investors—who do not have a commercial exposure they need to hedge—greater access to commodity futures markets. Demand from investors has been strong, with the “search for yield” prevalent in financial markets, making commodities an appealing investment option. Some recent surveys of market participants have indicated that a desire for return and diversification benefits remain the two key motivations for commodity investment.

Reflecting on these incentives, financial investment in commodities has grown rapidly, with assets under management exceeding \$500 billion in the first quarter of 2014, a significant growth compared to the \$50 billion reported to be invested in commodity markets during the peak of prices in 2008.

Most of the early investment in commodities was through broad-based commodity index funds, which use derivatives contracts to replicate the return of a specific commodity index, such as the Goldman Sachs Commodity Index. The majority of investment in recent years has been concentrated in exchange traded funds (ETFs) which track commodities (e.g., ETF Securities: <http://www.etfsecurities.com>).

Almost all non-precious metal commodity ETFs use derivatives to provide investors with exposure to commodities, with only a few holding the physical asset itself. The analysis here focuses on investors’ activities in commodity derivatives markets. Although a large share of ETFs track precious metals—particularly gold and, to a lesser extent, silver—these commodities have long been considered financial products and subject to speculative activity. Precious metal ETFs buy and store the underlying physical commodity, providing an obvious mechanism for investment to affect prices.

Also, unlike other commodities, ETFs typically have a smaller role as an input to production but are prominent as a store of value. Reflecting this, these commodities have not been the focus of global discussions by policymakers, including at the G-20. A widely used measure of the size of commodity derivatives markets is the value of open positions in major commodity futures contracts, which has increased substantially since 2001.

While prices have risen rapidly over recent years as commodities have emerged as an asset class for investors, the size of financial investment still remains modest relative to underlying physical commodity markets. Measures of total open interest are generally much smaller than the value of production and inventories, but turnover in futures markets can be significantly larger than measures of physical market size. Although a good deal of this turnover is

likely to be speculative, the comparatively small level of open interest suggests much of this trading is very short term in nature.

The Effect of Financial Investment

While the role of financial investment in commodities has clearly increased over the past decade, this does not necessarily imply that financial investors have significantly altered price dynamics. A number of factors suggest that, at least for most commodities, the effect has been small. First, price increases have been just as large for some commodities that do not have well-developed financial markets as for those that do. For example, the prices of iron ore and coal, which do not have large derivatives markets, have increased by as much as prices for most commodities that are actively traded in financial markets. These price increases reflect broad fundamentals, being underpinned by strong demand (particularly from China) and supply constraints. The falls in prices during the global financial crisis were consistent with the sharp fall in global growth at that time.

Second, there is significant differences in price behaviour between commodities, even among those that have large, active derivatives markets. For instance, the prices of oil and natural gas have diverged significantly in recent years due to the rapid growth in supply of natural gas in the USA (where these prices are measured), the result of technological developments in the shale gas sector. This suggests that, even where there has been a large increase in financial investment, fundamentals remain the dominant factor determining commodity prices (except perhaps in the very short run).

Third, the recent increase in the correlation between commodity prices and other financial prices—which is commonly cited as evidence that financial speculators are affecting prices—is not unusual in a historical context. Episodes of increased correlation between commodity and equity prices have occurred in the past at times when financial investment played little, or no, role in commodity markets. This indicates that asset and commodity prices tend to move together more closely when they are affected by common shocks, such as during the Great Depression in the 1930s and during the late 1970s.

This is unsurprising given the large swings in global demand and supply during these periods, which are fundamental drivers of both equity and commodity prices. The most recent episode is thus not unusual in this regard, given the very large global shocks that occurred; the early 2000s, when the correlation between commodity and equity prices was almost zero at a daily frequency, is not an appropriate benchmark for the crisis period.

Fourth, the evidence of a relative increase in the price correlation between commodities that make up the major commodity indices—and which are thus invested in by index funds—is mixed. A number of empirical studies, including by the Commodity Futures Trading Commission, the OECD, and the IMF, find minimal evidence of speculators' positions driving prices.

Commodity prices are currently both high and volatile relative to the past few decades, consistent with the physical supply and demand fundamentals that underpin these markets. However, the increase in prices and volatility is not unprecedented, having occurred during other large global supply and demand shocks throughout the past century. There is a lack of convincing evidence (at least to date) that financial markets have had a materially adverse effect on commodity markets over time periods of relevance to the economy. It is possible that speculators have had some effect on commodity price volatility, but their contribution would appear to be relatively small—particularly when compared with the contribution from fundamental factors—and short term in nature.

So let us look at these commodity markets themselves now. What are they made up of? What can be traded on these exchanges?

The Financial Commodity Markets

The commodity exchanges themselves do not in any way participate in the process of price discovery. It is neither a buyer nor a seller of futures contracts, so it doesn't have a role or interest in whether prices are high or low at any particular time. The role of the exchange is only to provide a central marketplace for buyers and sellers. It is this marketplace where supply and demand variables from around the world come together to discover the price.

The Commodity Futures Contract

A futures contract is a commitment to make or take delivery of a specific quantity and quality of the given commodity at a specific delivery location and time in the future. All terms of the contract are standardized except the price, which is discovered through supply (offers) and demand (bids). This price discovery process occurs through an exchange's electronic trading system or by the open auction on the trading floor of a regulated commodity exchange.

All the contracts are settled either through liquidation by an offsetting transaction (a purchase after an initial sale or a sale after initial purchase) or by delivery of an actual physical commodity. An offsetting transaction is the more frequently used method to settle a futures contract. Delivery usually occurs in less than 2 % of agriculture contracts traded.

Exchange Function

The main economic function of a futures exchange is the price risk management and price discovery. And the exchange accomplishes these functions by providing a facility and trading platform that bring buyer and seller together. An exchange also establishes and enforces rules to ensure that trading takes place in an open and competitive environment. For this reason, all bids and offers must be made via the exchange's electronic order entry trading system.

As a customer, users have the right to choose which trading platform he or she wants his or her trades placed on. One can make electronic trades directly through a broker or with pre-approval from a broker.

For open auction trades, one must call one's broker, who in turn calls the client order to an exchange member who executes the order. Technically all trades are ultimately made by the member of the exchange. If you are not a member you will work through the commodity broker, who may be an exchange member or who in turn may work with an exchange member.

Can a future price be considered a price prediction? In one sense yes, because the future price at any given time reflects the price expectation of both buyers and sellers at the time of delivery in the future. This is how futures prices help to establish a balance between production and consumption. However, in another sense, the answer to the question is no, because a future price is a price prediction subject to continuous change. Future prices adjust to reflect additional information about supply and demand as it becomes available.

Market Participants

Futures market participants fall into general categories: hedgers and speculators. A futures market exists primarily for hedging, which is defined as management of price risks inherent in the purchase and sale of commodities. The word "hedge" means protection. To hedge can be generally described as creating an equal and opposite position in a financial Commodity market that can offset or certainly contribute positively against any losses being incurred in the underlying physical market being hedged. In the context of futures trading, that is precisely what a hedge is: a counterbalancing transaction involving a position in the futures market that is opposite to one's current position in the cash market. Since the cash market price and future market price of a commodity tend to move up and down together, any loss or gain in the cash market is offset or counterbalanced in the future market.

Hedgers include:

- Farmers and livestock producers: who need protection against declining prices for crops and livestock, or against rising prices of purchased inputs such as feed.
- Mercantile elevators: who need protection against lower prices between the time they purchase or contract to purchase grain from farmers and the time it is sold.
- Food processors and feed manufacturers: who need protection against increasing raw materials cost or against decreasing inventory values.
- Exporters: who need protection against higher prices for grain contracted for future delivery but not yet purchased.
- Importers: who want to take advantage of lower prices for grain contracted for future delivery but not yet received.

Speculators:

Since the number of individuals and firms seeking protection against price movements up for a consumer or down for a producer or holder of stock in any given period of time is rarely matched or balanced (not everyone needs to hedge against prices going up when someone also needs to protect against prices going down), It is important that a varied mix of participants beyond pure hedgers are active in a market to create additional liquidity for hedgers to trade with. Generally the other key participant in any successful futures market offering liquidity are known as speculators.

Speculators facilitate hedging by providing market liquidity: the ability to enter and exit the market quickly, easily, and efficiently. They are attracted by the opportunity to realize profits if they prove to be correct in anticipating the direction and timing of price changes.

These speculators may be part of the general public or they may be professional traders, including members of an exchange trading either on an electronic platform or on a trading floor. Some exchange members are noted for their willingness to buy or sell even on their smaller price changes. Because of this a seller or buyer can enter and exit a market position at an efficient price.

Financial Integrity of the Market

A performance bond, or margin, in the futures industry is money that you as a buyer or seller of futures contracts must deposit with your broker, and which

the broker in turn must deposit with a clearing house. For example, if you trade CME group (Chicago Mercantile Exchange) products, your trades will clear through CME clearing. These funds are to ensure contract performance, much like a performance bond. This differs from the securities industry, where the margin is simply a down payment required to purchase stocks and bonds.

The amount of performance bond/margin a customer must maintain in their brokerage firm is set by the firm itself, subject to a certain minimum level established by the exchange where contracts are traded. If the change in future prices result in a loss on an open future position from one day to the next, funds will be withdrawn from the customer margin account to cover the loss. If the customer has deposit additional money in the account to comply with the performance bond/margin requirement, this is known as receiving a margin call.

On the other hand, if a price change results in a gain on an open future position, the amount of gain will be credited to the customer's margin account. The customer can make withdrawals from his or her account at any time, provided the withdrawal does not reduce the account balance below the required minimum. Once an open position has been closed by an offsetting trade, any money in the margin account not needed to cover losses, may be withdrawn by the customer.

Just as every trade is ultimately executed by or through an exchange member, so every trade is also cleared by or through a clearing member firm. In the clearing operation, the connection between the original buyer and seller is severed. This assurance is accomplished through the mechanism of daily cash settlement. Each day, clearing determines the gain or loss on each trade. It then calculates the total gains or losses on all trades cleared by each clearing member firm. If a firm has incurred a net loss for the day, their account is debited and the firm may be required to deposit an additional margin with the clearing house. Conversely, if the firm has a net gain for the day, the firm receives the credit to its account. The firm then credits or debits each individual customer account.

Hedging with Futures and Basis

Hedging is based on the principle that cash market prices and future market prices tends to move up and down together. This movement is not necessarily identical, but it is usually close enough that it is possible to lessen the risk of loss in the cash market by taking an opposite position in the future market. Taking an opposite position allows losses in one market to be offset by gains in another. In this manner, the hedger is able to establish a price level for a

cash market transaction that may not actually take place for several months. Any disparity in the correlation between the financial commodity futures contract and the physical underlying market is known as “basis risk”. This basis risk is often created through a time spread, that is you are trying to trade or protect the physical market today but often having to utilize a futures contract which is actually for delivery/pricing perhaps one month in the future. Naturally there will be some distortion/loss in correlation due to this time spread. Sometimes the physical specification of the commodity traded in the exchange varies from the precise commodity we are trading or protecting in the real world—this would also introduce some basis risk.

The Short Hedge

To give a better idea of how hedging works, let’s suppose it is May and you are a soybean farmer with a crop in the field; or perhaps an elevator operator with soybeans you have purchased but not yet sold. In market terminology you are in a long cash market position. The current cash market price for soybeans to be delivered in October is \$12.00 per bushel. If the price goes up between now and October, when you plan to sell, you will gain. On the other hand, if the price goes down during that time, you will have a loss.

To protect yourself against the possibility of a price decline during the coming months you can hedge by selling a corresponding number of bushels in the futures market now and buy them back later when it is time to sell the crop in the cash market. If the cash price declines by the harvest, any loss incurred will be offset by the gain from the hedge in the futures market. This particular type of hedge is known as a short hedge because of the initial short future position.

With futures, a person can sell first and buy later or buy first and sell later. Regardless of the order in which the transaction may occur, buying a lower price and selling at a higher price will result in a gain in the future position.

Selling now with the intention of buying back at a later date gives a short future market position. A price decrease will result in a future gain, because you will have sold at a higher price and bought at a lower price. For example, let us assume cash and future prices are identical at \$12 per bushel. What happens if the price declines by \$1.00 per bushel and the value of your short future market position increases by \$1 per bushel? Because the gain on your future position is equal to the loss on the cash position, your net selling price is still \$12.00 per bushel (Table 3.1).

Table 3.1 Comparison of the cash and future markets of soybeans

Cash market		Future market
May	Cash soybeans are \$12.00/bu	Sell Nov soybean future at \$12.00/bu
	Sell cash soybean at \$11.00/bu	Buy Nov soybean future at \$11.00 /bu
	\$1.00/bu loss	\$1.00/bu gain
	Sell cash soybean at	\$11.00/bu
	Gain on future position	+\$1.00/bu
	Net selling price	\$12.00/bu

Table 3.2 Comparison of the cash and future markets of soybeans with price modification

Cash market		Future market
May	Cash soybeans are \$12.00/bu	Sell Nov soybean future at \$12.00/bu
	Sell cash soybean at \$13.00/bu	Buy Nov soybean future at \$13.00/bu
	\$1.00/bu gain	\$1.00/bu loss
	Sell cash soybean at	\$13.00/bu
	Loss on future position	\$1.00/bu
	Net selling price	\$12.00/bu

What if soybean prices had instead risen by \$1.00 per bushel? Once again, the net selling price would have been \$12.00 per bushel, as a \$1 per bushel loss on the short future position would be offset by a \$1.00 per bushel gain on the long cash position.

Notice that, in both cases, the gain and losses on the two markets position cancel one another out. That is, when there is a gain in one market position there is a comparable loss on the other. This explains why hedging is often said to be a “lock in” at a price level (Table 3.2).

In both instances, the hedge accomplishes what it set out to achieve: it established a selling price of \$12.00 per bushel for soybeans to be delivered in October. With a short hedge, you give up the opportunity to benefit from a price increase to obtain protection against a price decrease.

The Long Hedge

On the other hand, livestock feeders, grain importers, food processors, and other buyers of agriculture products often need protection against rising prices and use a long hedge involving an initial long futures position instead. For example, assume it is July and you are planning to buy corn in November. The cash market price in July for corn delivered in November is \$6.50 per bushel, but you are concerned that, by the time you make the purchase, the price

Table 3.3 Comparison of the cash and future markets of corn

Cash market		Future market
May	Cash corn is \$6.50\$/bu	Buy Dec corn future at \$6.50/bu
	Buy cash corn at \$7/bu	Sell Dec corn future at \$7.00 /bu
	\$0.50/bu loss	\$0.50/bu gain
	Buy cash corn at	\$7.00/bu
	Gain on future position	\$0.50/bu
	Net selling price	\$6.50/bu

Table 3.4 Comparison of the cash and future markets of corn with price modification

Cash market		Future market
May	Cash corn is \$6.50\$/bu	Buy Dec corn future at \$6.50/bu
	Buy cash corn at \$6.00/bu	Sell Dec corn future at \$6.00 /bu
	\$0.50/bu gain	\$0.50/bu loss
	Buy cash corn at	\$6.00/bu
	Gain on future position	\$0.50/bu
	Net selling price	\$6.50/bu

may be much higher. To protect yourself against the possible price increase, you buy December corn futures at \$6.50 per bushel (Table 3.3). What would happen if corn price increase 50 % per bushel by November?

In this example, the higher cost of the corn in the cash market was offset by a gain in the future market. Conversely, if corn prices decrease by 50 % per bushel by November, the lowest cost of corn in the cash market would be offset by a loss in the future market. The net purchase price would still be \$6.50 per bushel (Table 3.4).

Remember, whether you have a short hedge or long hedge, any losses on your futures position may result in a margin call from your broker, requiring you to deposit additional funds to your performance bond account. As previously discussed, adequate funds must be maintained in the account for day to day losses. However, keep in mind that if you are incurring losses on your future market position, then it is likely that you are incurring gains in your cash market positions

Basis: The link between Futures and Cash Prices

All of the examples just presented assumed identical cash and future prices. But if you are in a business that involves buying and selling grains or oilseeds, you know that the cash price in your area or what your supplier quotes for a given commodity usually differs from the price quoted in the future market. Basically, the local cash price for a commodity is the future price adjusted for

such variables as freight, handling, storage, and quality, as well as local supply factors. The price difference between the cash and future prices may be slight or it may be substantial, and the two prices may not vary by the same amount.

The price difference (between cash price and future price) is known as the basis. A primary consideration in evaluating the basis is its potential to strengthen and weaken. The more positive the basis becomes, the stronger it is. In contrast, the more negative the basis becomes, the weaker it is.

For example, a basis change from 50 cents under (a cash price 50 cents less than the future price) to a basis of 40 cents under (a cash price 40 cents less than the future price) indicates a strengthening basis, even though it is still negative. On the other hand, a basis change from 20 cents over (a cash price 20 cents more than the future price) to a basis of 15 cents over (a cash price 15 cents more than the future price) indicates a weakening basis, despite the fact that it is still positive. The basis is simply quoting the relationship of local cash price to future cash price.

Basis and the Short Hedge

Basis is important to the hedger because it affects the final outcome of the hedge. For example, suppose it is March and you plan to sell wheat to your local elevator in mid-June. The July wheat futures price is \$6.50 per bushel, and the cash price in your area in mid-June is normally about 35 under the July future price.

The approximate price you can establish by hedging is \$6.15 per bushel (\$6.50–\$0.35) provided the basis is 35 under. Table 3.5 shows the result if the future price declines to \$6.00 by June and the basis is 35 under.

Suppose, instead, the basis in mid-June had turned out to be 40 under rather than the expected 35 under. Then, the selling price would be \$6.10, rather than \$6.15 (Table 3.6).

Table 3.5 Comparison of the cash and future markets of wheat

Cash market	Future market	Basis
Expected cash wheat price is \$6.15/bu	Sell July wheat futures at \$6.50	-0.35
Sell cash wheat at \$5.65/bu	Buy July wheat futures at \$6.00/bu	-0.35
\$0.50/bu loss	\$0.50/bu gain	0
Sell cash wheat at gain on futures position		
Net selling price		

Table 3.6 Comparison of the cash and future markets of wheat: weaker-than-expected basis

Cash market	Future market	Basis
Expected cash wheat price is \$6.15/bu	Sell July wheat futures at \$6.50	-0.35
Sell cash wheat at \$5.60/bu	Buy July wheat futures at \$6.00/bu	-0.40
\$0.55/bu loss	\$0.50/bu gain	0.5 loss
Sell cash wheat at gain on futures position		
Net selling price		

Table 3.7 Comparison of the cash and future markets of wheat: stronger-than-expected basis

Cash market	Future market	Basis
Expected cash wheat price is \$6.15/bu	Sell July wheat futures at \$6.50	-0.35
Sell cash wheat at \$5.75/bu	Buy July wheat futures at \$6.00/bu	0.25
\$0.40/bu loss	\$0.50/bu gain	0.10 gains
	Sell cash wheat at gain on futures position	
	Net selling price	

This example illustrates how a weaker-than-expected basis reduces your net selling price. And, as you might expect, your net selling price increases with a stronger-than-expected basis.

As explained earlier, a short hedger benefits from a strengthening basis. This information is important to consider when hedging, that is, as a short hedger. If you like the current future price and expect the basis to strengthen, you should consider hedging a portion of your crop or inventory as shown in the table below (Table 3.7). On the other hand, if you expect the basis to weaken and would benefit from today's price, you might consider selling your commodity now (Table 3.7).

Basis and the Long Hedge

How does the basis affect the performance of the long hedge? Let's look first at a livestock feeder who, in October, is planning to buy soybean meal in April. May soybean meal futures are \$350 per ton and the local basis in April is typically \$20 over the May futures price, for an expected purchase price of \$370 per ton (\$350+\$20). If the future price increases by \$380 by April and the basis is \$20 over, the net purchase price remains at \$370 per ton (Table 3.8).

Table 3.8 Comparison of the cash and future markets of soybeans

Cash market	Future market	Basis
Expected cash soybean meal price is \$370/ton	Buy May soybean meal futures at \$350/ton	+\$20
Buy cash soybean meal at \$400/ton	Sell May soybean meal futures at \$380/ton	+\$20
\$30/ton loss	\$0/ton gain	0
Buy cash soybean meal at gain on futures position		
Net purchase price		

Table 3.9 Comparison of the cash and future markets of soybeans

Cash market	Future market	Basis
Expected cash soybean meal price is \$370/ton	Buy May soybean meal futures at \$350/ton	+\$20
Buy cash soybean meal at \$440/ton	Sell May soybean meal futures at \$400/ton	+\$40
\$30/ton loss	\$0/ton gain	\$20 loss
Buy cash soybean meal at gain on futures position		
Net purchase price		

What if the basis strengthens—in this case becomes more positive—and, instead of the expected \$20 per ton over, it is actually \$40 per ton over in April?

Conversely, if the basis weakens, moving from \$20 over to \$10 over, the net purchase price drops to \$360 per ton ($\$350 + \10) (Table 3.9).

Notice how long hedgers benefit from a weakening basis, which is the opposite of a short hedger. It is important to consider basis history and market expectations when hedging as a long hedger, if you of your commodity purchase. On the other hand, if you expect the basis to strengthen and you like today’s prices, you might consider buying or pricing your commodity now (Table 3.10).

Hedging with futures offers you the opportunity to establish an approximate price months in advance of the actual sale or purchase of the physical Commodity and to protect the hedger from unfavourable price changes. This is possible because cash and futures prices tend to move in the same direction and by similar amounts, so losses in one market can be offset with gains in the other. Although the futures hedger is unable to benefit from favourable price changes, you are protected from unfavourable market moves.

Basis risk is considerably less than the price risk, but basis behaviour can have significant impact on the performance of a hedge.

Table 3.10 Comparison of the cash and future markets of soybeans

Cash market	Future market	Basis
Expected cash soybean meal price is \$370/ton	Buy May soybean meal futures at \$350/ton	+\$20
Buy cash soybean meal at \$390/ton	Sell May soybean meal futures at \$380/ton	+\$10
\$20/ton loss	\$30/ton gain	\$10 gain
Buy cash soybean meal at gain on futures position		
Net purchase price		

Table 3.11 Basis record example

Date	Cash price	Future price/ month	Basis	Market factors
10/02	\$6.60	\$6.77 Dec	−\$.17(z*)	Extended local dry spell in forecast
10/03	\$6.70	\$6.95 Dec	−\$.25(z)	Report of stronger than expected exports

Importance of Historical Basis

By hedging with futures, buyers and sellers are eliminating futures price level risk and assuming basis level risk. Although it is true that basis risk is relatively less than the risk associated with either cash price or future market prices, it is still a market risk. Buyers and sellers of commodities can do something to manage their basis risk. Since agriculture tends to follow historical and seasonal patterns, it makes sense to keep good historical basis records.

Table 3.11 is a sample of a basis record. Although there are numerous formats available, the content should include the date, cash market price, future market price (specify contract month), and basis and market factors for that date. This information can be put in the chart format as well.

Basis Table notes:

The most common type of basis record will track the current cash market price to the nearby future contract month price. It is good practice to switch the nearby contract month price prior to entering the delivery month. For example, beginning with the second from last business day in November, switch tracking from December corn futures to March corn futures (the next contract month in the corn futures cycle).

It is common to track the basis either daily or weekly. If you choose to track on a weekly schedule, be consistent in the day or week you follow. Also you may want to avoid tracking prices and basis only on Mondays and Fridays.

A basis table will help you compare the current basis with the expected basis at the time of your purchase and sale. In other words, it will help determine if a supplier's current offer or an elevator's current bid is stronger or weaker than that expected at the time of purchase and sale.

Putting basis information from multiple years on a chart will highlight the seasonal and historical patterns. It will also show the historical basis range (strongest and weakest level) for any given time period, as well as the average.

Future Hedging Strategies for Buying and Selling Commodities

Now that you have a basic understanding of how futures contracts are used to manage risks and how basis affects buying and selling decisions, it is time to try your hand at a few strategies. Through this, you can:

- recognize those situations when you should benefit most from your hedging situation;
- calculate the dollars and cents outcome of a given strategy, depending on market conditions;
- understand the risk involved in the marketing decision.

The strategies include:

- buying futures for protection against rising commodity prices;
- selling futures for protection against falling commodity prices.

As mentioned previously, hedging is used to manage your price risk. If you are a buyer of commodities and want to hedge your position, you would initially buy futures contracts for protection against rising prices. At a date closer to the time you plan to actually purchase the commodity, you would offset your future position by selling back the futures contract you initially bought. This type of hedge is known as a long hedge. A long hedger benefits from a weakening basis.

On the other hand, if you sell the commodities and need protection against a falling price, you initially sell the futures contract. At a date closer to the

time you price the physical commodity, you would buy back the futures contract you initially sold. This is referred to as a short hedge. A short hedger benefits from a strengthening basis.

The following strategies are examples of how those in agribusiness use futures contracts to manage price risk. Also note how basis information is used in making hedging decisions and how changes in the basis affects the final outcome.

Buying Futures for Protection against Rising Prices

Assume you are a feed manufacturer and purchase corn on a regular basis. It is December and you are in the process of planning the corn purchases for the month of April—wanting to take delivery of the corn during mid-April. Several suppliers in the area are offering long term purchasing agreements, with the best quote among them on 5 % over May futures. CME group May futures are currently trading at \$5.75 per bushel, equating to a cash forward offer at \$5.80 per bushel.

If you take a long term purchase agreement, you will lock in the future price of \$5.75 per bushel and a basis 5 % over, or a flat price of \$5.80 per bushel. Or you could establish the future hedge, locking in a future price of \$5.75 per bushel but leaving the basis open.

In reviewing the records and historical prices, you discover the spot price of corn in your area during mid-April averages five cents under May future prices. And based on current market conditions and what you anticipate happening between now and April, you believe the mid-April basis will be close to 5 cents under. Action: since you like the current future price but anticipate the basis weakening, you decide to hedge the purchase using a future contract rather than to enter in the long term purchase agreement. You purchase the number of corn contracts that equals the amount of corn you want to hedge.

For example, if you want to hedge 15,000 bushels of corn, you buy (go long) three corn future contracts because each contract equals 5000 bushels. By hedging with the May corn future, you lock in a purchase price level of \$5.75, though the basis level is not locked in at this time. If the basis weakens by April, you will benefit from any basis improvement. Of course, you realize the basis could surprise you and strengthen, but, based on your records and market expectations, you feel it is in your best interest to hedge your purchases.

Price Increase Scenario

If the price increases and the basis is at 5 % over, you will purchase corn at \$5.80 per bushel (future price of \$5.75, the basis of \$0.05 over). But if the price increase and basis weaken, the purchase price is reduced accordingly.

Lets assume by the middle of April, when you need to purchase the physical corn, the May future price is increased to \$6.25 and the best offer for physical corn in your area is \$6.20 per bushel (future price, the basis of \$0.05 under) (Table 3.12).

With the future price at \$6.25, the May corn futures contract is sold back for a net gain of 50 % per bushel (\$6.25–\$5.75). The amount is deducted from the current local cash price of the corn at \$6.20 per bushel, which equals a net purchase price of \$5.70. Notice the price is 50 % lower than the current cash price and 10 % lower than what you would have paid for the corn through a long term purchase agreement. The lower prices are the result of the weakening of the basis by 10 %, moving from 5 % over to 5 % under May futures.

Prices Decrease Scenario

If prices decrease and the basis remains unchanged, you will still pay \$5.80 per bushel for corn. Hedging with futures provides protection against rising prices, but it does not allow you to take advantage of lower prices. In making the decision to hedge, one is willing to give up the chance to take advantage of lower prices in return for price protection. On the other hand, the purchase price will be lower if the basis weakens.

Assume by mid-April that the May futures price is \$5.45 per bushel and the best quote offered by an area supplier is also \$5.45 per bushel. You purchase corn from the supplier and simultaneously offset your futures position by selling back the futures contracts you initially bought.

Table 3.12 Comparison of the cash and future markets of corn

	Cash market	Future market	Basis
Dec	Long term offer at \$5.80/bu	Buy May corn future at \$5.75/bu	+0.05
April	Buy cash corn at \$6.20/bu	Sell May corn future at \$6.25/bu	-0.05
Change	\$0.40/bu loss	\$0.50/bu gain	0.10 gain
Buy cash corn at	\$6.20/bu		
Gain on future position	-\$0.05/bu		
Net purchase price	\$5.70/bu		

Table 3.13 Comparison of the cash and future markets of corn

	Cash market	Future market	Basis
Dec	Long term offer at \$5.80/bu	Buy May corn future at \$5.75/bu	+0.05
April	Buy cash corn at \$5.45/bu	Sell May corn future at \$5.45/bu	0.00
Change	\$0.35/bu gain	\$0.30/bu loss	0.05 gain
Buy cash corn at	\$5.45/bu		
Loss on future position	+\$0.30/bu		
Net purchase price	\$5.75/bu		

Even though you were able to purchase cash corn at a lower price, you lost 30 % on your futures position. This equates to a net purchase price for corn of \$5.75. The purchase price is still 5 % lower than what you would have paid for corn through a long-term purchase agreement. Again, this difference reflects a weakening of the basis from 5 % over to even (no basis).

In hindsight, you would have been better off neither taking the long-term purchase agreement nor hedging because prices fell. But your job is to purchase corn, add value to it, and sell the final product at a profit. If you don't do anything to manage price risk, the result could be disastrous to your firm's bottom line. Back in December, you evaluated the price of corn, basis records, and your firm's expected profits based upon the information. You determine by hedging and locking in the price of corn that your firm could earn a profit from. You also believe that the basis would weaken, so you hedged to try and take advantage of a weakening basis. Therefore you accomplished what you intended. The price of corn could have increased just as easily (Table 3.13).

Price Increase/Basis Strengthens Scenario

If the price rises and the basis strengthens, you will be protected from the price increase by hedging, but the strengthening basis will increase the final net purchase price relative to the long-term purchase agreement.

Assume in Mid-April your supplier is offering corn at \$6.10 per bushel and the May futures contract is trading at \$6.03 per bushel. You purchase the physical asset and offset the future position by selling back the future contract at \$6.03. This provides you with a future gain of 28 % per bushel, which lowers the net purchase price. However, the gain does not make up entirely for the higher price of corn. The two-cent difference between the long-term purchase agreement and the net purchase price reflects the strengthening basis (Table 3.14).

Table 3.14 Comparison of the cash and future markets of corn

	Cash market	Future market	Basis
Dec	Long term offer at \$5.80/bu	Buy May corn future at \$5.75/bu	+0.05
April	Buy cash corn at \$6.20/bu	Sell May corn future at \$6.25/bu	+0.07
Change	\$0.30/bu loss	\$0.28/bu gain	0.02 loss
Buy cash corn at	\$6.10/bu		
Gain on future position	-\$0.28/bu		
Net purchase price	\$5.82/bu		

Table 3.15 Alternatives comparisons

If May future price in April is	April basis	Alternative 1 (spot cash price)	Alternative 2 (hedge with futures at \$5.75)	Alternative 3
\$5.65	+0.05	\$5.70	\$5.80	\$5.80
\$5.75	+0.05	\$5.80	\$5.80	\$5.80
\$5.85	+0.05	\$5.90	\$5.80	\$5.80
\$5.65	-0.05	\$5.50	\$5.70	\$5.80
\$5.75	-0.05	\$5.70	\$5.70	\$5.80
\$5.85	-0.05	\$5.80	\$5.70	\$5.80
\$5.65	+0.10	\$5.75	\$5.85	\$5.80
\$5.75	+0.10	\$5.85	\$5.85	\$5.80
\$5.85	+0.10	\$5.95	\$5.85	\$5.80

As we’ve seen in the preceding example, the final outcome of a future hedge depends on what happens to the basis between the time a hedge is initiated and offset. In that scenario, one benefits from a weakening basis.

In regard to other marketing alternatives, you may be asking yourself how future hedging compares. Suppose you have entered a long-term agreement instead of hedging. Or maybe you did nothing at all. What happens then?

Table 3.15 compares your alternatives, illustrating the potential net purchase price under possible future prices and a basis scenario. You initially bought May corn futures at \$5.75. You cannot predict the future but you can manage it. By evaluating your market expectation a month ahead and by reviewing past records you will be in a better position to take action and not let a buying opportunity pass you by.

Alternative 1 shows what your purchase price would be if you did nothing at all. While you would benefit from a price decrease, you are at risk if prices increase and you are unable to manage your bottom line.

Alternative 2 shows what your price would be if you established a long hedge in December, offsetting the futures position when you purchase physical corn in April. As you can see, a changing basis affects the net purchase price but not as much as a significant price change.

Alternative 3 shows what your purchase price would be if you entered a long-term purchase agreement in December. Basically, nothing affected your final purchase price, but you could not take advantage of a weakening basis or lower prices.

Selling Futures for Protection against Falling Prices

Assume you are a corn producer. It is May 15 and you have just finished planting your crop. The weather has been unseasonably dry, driving prices up significantly. However, you feel that the weather pattern is temporary and are concerned corn prices will decline before harvest.

Currently, December corn futures are trading at \$5.70 per bushel and the best bid on a forward contract is \$5.45 per bushel, or 25 % under a December future contract. Your estimated cost of production is \$5.10 per bushel. Therefore, you can lock in the profit of 35 % per bushel through this forward contract. Before entering into the contract, you review historical prices and basis records and discover the local basis during mid-November is usually about 15 % in near futures.

Action Because the basis in the forward contract is historically weak, you decide to hedge using futures. You sell the number of corn contracts equal to the amount you hedge. For example, if you want to hedge 20,000 bushels of corn, you sell (go short) four corn futures contracts because each contract equals 5000 bushels. By selling December corn futures, you lock into selling at \$5.45 if the price remains unchanged (future price is \$5.70, the basis is \$0.25). If the basis strengthens, you will benefit from any basis appreciation. But remember, there is a chance the basis could actually weaken so, although you maintain the basis risk, the basis is generally much more stable and predictable than either the cash market or the futures market price.

Price Decrease Scenario If the price declines and the basis remains unchanged you are protected from price decline and will receive \$5.45 per bushel for your crop (future price is \$5.70, the basis is \$0.25). If the price drops and the basis strengthens, you will receive more than the expected price for your corn. By November, the best spot bid in your area is \$5.05 per bushel. Fortunately, you hedged in the future market and the current December future price is \$5.20. When offsetting the future by buying back the same type and amount of future contracts as you initially sold, you achieve a gain of 50 % per bushel

Table 3.16 Comparison of the cash and future markets of corn

Cash market		Future market	Basis
May	Cash forward (Nov) bid at \$5.45/bu	Sell Dec corn futures at \$5.70/bu	-\$0.25
Nov	Sell cash corn at \$5.05/bu	Buy Dec corn futures at \$5.20/bu	-0.15
Change	\$0.40/bu loss	\$0.50/bu gain	0.10 gain
Sell cash corn at	\$5.05/bu		
Gain on future position	+\$0.50/bu		
Net selling price	\$5.55/bu		

(\$5.70-\$5.20). Your gain in the future market increases the net sale price. As you can see from Table 3.16, the net sale price is actually 10 % greater than the forward market bid quoted in May. This price difference reflects the change in basis, which strengthened by 10 % between May and November (Table 3.17).

Price Increase Scenario

If the price increase and the basis remain unchanged, you will still receive \$5.45 per bushel for your crop. That is the future price (\$5.70) less than the basis (25 % under). With future hedging, you lock in a selling price and cannot take advantage of a price increase. The only variable that ultimately affects your selling price is the basis. As shown in the above example, you will receive a higher than expected price if the basis strengthens.

Suppose by mid-November, the future price of corn increases to \$5.90 per bushel and the local price for the corn is \$5.70 per bushel. Under this scenario, you will receive \$5.50 per bushel: 5 cents more than the May forward contract bid. In reviewing Table 3.18, you will see the relatively higher price reflects a strengthening basis and not the price level increase. Once you establish the hedge, the future price level is locked. The only variable is the basis.

If you could have predicted the future in May, you could have sold on the cash in November for \$5.70 per bushel rather than hedging. But predicting the future is beyond your control. In May, you liked the price level and knew the basis was historically weak. Knowing your production cost was \$5.10 per bushel, a selling price of \$5.45 per bushel provided you with a respectable profit margin.

In both of these examples the basis strengthened between the time the hedge was initiated and offset, which worked to your advantage. But how would your net selling price be affected if the basis weakened?

Table 3.17 Comparison of the cash and future markets of corn (Change of Basis)

Cash market		Future market	Basis
May	Cash forward (Nov) bid at \$5.45/bu	Sell Dec corn futures at \$5.70/bu	-\$0.25
Nov	Sell cash corn at \$5.70/bu	Buy Dec corn futures at \$5.90/bu	-0.20
Change	\$0.25/bu gain	\$0.20/bu loss	0.10 gain
	Sell cash corn at \$5.70/bu		
	Loss on future position +\$0.20/bu		
	Net selling price \$5.50/bu		

Table 3.18 Comparison of the cash and future markets of corn

Cash market		Future market	Basis
May	Cash forward (Nov) bid at \$5.45/bu	Sell Dec corn futures at \$5.70/bu	-\$0.25
Nov	Sell cash corn at \$5.10/bu	Buy Dec corn futures at \$5.37/bu	-0.27
Change	\$0.35/bu loss	\$0.33/bu gain	0.02 gain
	Sell cash corn at \$5.10/bu		
	Gain on future position +\$0.33/bu		
	Net selling price \$5.43/bu		

Price Decrease/Basis Weakens Scenario

If the price decreases and the basis weakens, you will be protected from price decrease by hedging, though weakening the basis will slightly decrease the final net sales price. Assume that by mid-November the December future price is \$5.37 and the local basis is 27 % under. After offsetting your future position and simultaneously selling your corn, the net sales price equals \$5.43 per bushel. You will notice that the net sale price is 2 % lower than the forward contract bid in May, reflecting the weaker basis.

As we have seen in the preceding examples, the final outcome of the future hedge depends on what happens to the basis between the time when the hedge was taken and offset. In these scenarios, you benefited from a strengthening basis and received the lower selling price from a weakening basis.

In regards to other marketing alternatives, you may be asking yourself the following. How does future hedging compare? Suppose you entered into a forward contract instead of hedging? Or, if you did nothing, what happened then?

Table 3.19 compares your alternatives and illustrates the potential net return under several different price levels and changes to the basis.

Table 3.19 Alternatives comparison

If Dec futures price in Nov is	Mid- Nov basis	Alternative 1: do nothing (spot cash price)	Alternative 2: hedge with futures at \$5.70	Alternative 3: cash forward contracts at \$5.45
\$5.60	+0.25	\$5.35	\$5.45	\$5.45
\$5.70	+0.25	\$5.45	\$5.45	\$5.45
\$5.80	+0.25	\$5.55	\$5.45	\$5.45
\$5.60	-0.15	\$5.45	\$5.55	\$5.45
\$5.70	-0.15	\$5.55	\$5.55	\$5.45
\$5.80	-0.15	\$5.65	\$5.55	\$5.45
\$5.60	-0.35	\$5.25	\$5.35	\$5.45
\$5.70	-0.35	\$5.35	\$5.35	\$5.45
\$5.80	-0.35	\$5.45	\$5.35	\$5.45

You can calculate your net sale price under different future prices and changes to the basis. Of course, hindsight is always 20/20, but the historical record will help you take action and avoid missing a selling opportunity.

Alternative 1 shows what your selling price would be if you did nothing at all. While you would benefit from the price increase, you are at risk if the price of corn decreases and is at the mercy of the market.

Alternative 2 shows what your net return would be if you establish the short hedge at \$5.70 in May, offsetting the future position when you sell your corn in November. As you can see the changing basis is the only thing which affects the net sale price.

Alternative 3 shows what your net return would be if you cash forward contracts in May. Basically nothing affected your final sales price, but you could not take advantage of the strengthening basis or higher prices.

The Basis of Ag Options

Hedging with futures is a valuable risk management tool if used at the right time. Hedging allows you to lock in a certain price level and protect you against adverse price moves. In other words, you are committed to a specific buying and selling price and are willing to give up any additional benefit if the price moves in your favour because you want price protection.

Remember, hedging involves holding an opposite position in the cash and futures markets. So as the value of one position rises, the value of the other position falls. If the value of a hedger's cash market position increases, the value of his or her futures market decreases and he or she will receive a performance bond/margin call.

When buying an option, a hedger is protected against an unfavourable price change but, at the same time, can take the advantage of a favourable price change. In addition, buying an option does not require the performance bond/margin, so there is no risk of receiving a performance bond/margin call.

These features allow the seller of ag commodities to establish a floor (minimum) selling price for protection against falling markets without providing the opportunity to profit from a rising market. Likewise the option allows the buyer of ag products to set a ceiling (maximum) buying price and protect themselves from price increases. At the same time, they retain the ability to take advantage of price decreases. The cost of these prices is an option premium, which the option buyer pays.

Rather than buying the option to protect yourself from an unfavourable price change, sometimes you may find it attractive to sell the option. Although selling an option provides only limited protection against unfavourable market moves (limited to the amount of cash premium paid by the buyer of the option) and requires you to place with the relevant exchange performance bond/margin, it provides additional income if prices remain stable or move in a favourable direction. The option seller collects the premium.

What Is an Option?

An option is simply the right, but not the obligation, to buy or sell something at a specified predetermined price (strike price) at any time within the specified time period. A commodity option contains the right to buy or sell a specific future contract. There are two distinct types of options: the call option and the put option. The call option contains the right to buy the underlying future contracts and the put option contains the right to sell the underlying future contract. Note that call and put options are not the opposite of each other, nor do they offset position.

Call and put options are completely separate and different contracts. Every call option has a buyer and a seller and every put option has a buyer and a seller. Buyers of calls and puts are buying (holding) the right contained in the specific option. Sellers of put and call options are selling (granting) the right contained in the specific option.

The option buyer pays a price for the right contained in the option. The option price is known as a premium. An option buyer has limited loss potential (premium paid) and unlimited gain potential. The premium is paid initially when the option is brought. Since the option buyer has a right but not

Table 3.20 Exercise position table

	Call option	Put option
Option buyer	Pays premium; right to buy	Pays premium ; right to sell
Option seller	Collects premium; obligation to sell	Collects premium obligation to buy

an obligation, he or she does not have a performance bond/margin requirement and can exercise (use) the right any time prior to the option expiration.

The option seller collects the premium for his or her obligations to fulfil the rights, and has limited gain potential (premium received) and unlimited loss potential, due to the obligation of the position. Since the option seller has an obligation in the market place, he or she has performance bond/margin requirements to ensure contract performance.

Option sellers are obliged to fulfil the rights contained in an option if and when the buyer chooses to exercise the right. Although option sellers cannot initiate the exercise process, they can offset their short option position by buying an identical option at any time prior to the close of the last trading day (Table 3.20).

Underlying Commodity

Traditional commodity options are called standard options. Standard contracts have the same contract month name as the underlying future contract. Exercising a standard option will result in a future position in the same contract month as the option at the specified strike price.

Exercising a \$12.00 November soybean call option will result in the call option buyer receiving a long (buy) position in a November soybean future at \$12.00, and the call option seller receiving a short (sell) position in November soybean futures at \$12.00.

When Do Option Rights Expire?

The last trading day and the expiration of standard and serial options occur in the month prior to their contract month name (e.g., March oats options expire in February and October wheat serial options expire in September). The last trading day and expiration of a weekly option is a given Friday that is not also the last trading day in a standard or serial option.

Table 3.21 Commodity standard vs serial months

Standard months	Serial months
<i>Corn, wheat and oats</i>	
March	January
May	February
July	April
September	June
December	August
	October
November	
<i>Rice</i>	
January	February
March	April
May	June
July	August
September	October
November	December
<i>Soybeans</i>	
January	February
March	April
May	June
July	October
August	December
September	
November	
<i>Soybean oil and meal</i>	
January	February
March	April
May	June
July	November
August	
September	
October	
December	

The last trading day of an option is the Friday preceding the first position day of the contract month. Therefore, a general rule of thumb is that the option last trading day will be the third or fourth Friday in the month prior to the option contract month. Option expiration occurs at 7.00 p.m. on the last trading day (see Table 3.21).

How Are Options Traded?

CME group option contracts are traded in much the same manner as their underlying futures contracts. All buying and selling occurs through competitive bids and offers made via the globex electronic trading platform or in a

trading pit on the floor. There are several important facts to remember when trading options:

- At any given time, a number of different call and put options are trading simultaneously—different in terms of commodities, contract months, and strike prices. Strike prices are listed in predetermined intervals (multiples) for each commodity. Since strike price intervals may change in response to market conditions, CME group/Chicago Board of Trade (CBOT) rules and regulations should be checked for current contract information.
- When an option is first listed, the strike price includes at-or-near-the-money options, and strikes above and strikes below the at-the-money strike. This applies to both puts and calls. As market conditions change additional strike prices are listed, offering you a variety of strikes to choose from.
- An important difference between futures and options is that trading in futures contracts is based on prices, while trading in options is based on premiums. To illustrate this consider someone wanting to buy a December corn future contract who might bid \$6.50 per bushel. But a person wanting to buy an option on December corn futures might bid 25 cents for a \$6.60 call option or 40 cents for a \$6.40 call option. These bids, 25 cents and 40 cents, are the premiums that a call option buyer pays a call option seller for the right to buy a December corn future contract at \$6.60 and \$6.40, respectively.
- The premium is the only element of the option contract negotiated through the trading process; all other contract terms are standardized.
- For an option buyer, the premium represents the maximum cost or amount that can be lost, since the option buyer is limited only to the initial investment. In contrast, the premium represents the maximum gain for an option seller.

Option Pricing

At this point in our study of options, you may be asking yourself some important questions. How are option premiums derived on a day to day basis? Will you have to pay 10 cents for particular options? Or will it cost 30 cents? And if you bought an option and want to sell it prior to expiration, how much will you be able to get for it?

The short answer to these questions is that the premium is determined by basic supply and demand fundamentals. In an open auction market, buyers

want to pay the lowest possible price for an option and sellers want to earn the highest possible premium. There are basic elements which ultimately affect the price of an option as they relate to supply and demand, and they will be covered in the following sections.

An option premium consist of two components:

1. its intrinsic value;
2. its time value.

An option's premium at any given time is the total of its intrinsic value and its time value. The total premium is the only number you will see or hear quoted. However, it is important to understand the factors that affect the time value and intrinsic value, as well as their relative impact on the total premium.

Intrinsic Value

This is the amount of money that could be currently realized by exercising an option with a given strike price. An option's intrinsic value is determined by the relationship of the option strike price to the underlying futures price. An option has intrinsic value if it is currently profitable to exercise the option.

A call option has intrinsic value if its strike price is below the future price. For example, if a soybean call option has a strike price of \$12.00 and the underlying futures price is \$12.50, the call option will have an intrinsic value of 50 cents. A put option has intrinsic value if its strike price is above the futures prices. For example, if a corn put option has a strike price of \$5.60 and the underlying futures prices is \$5.30, the put option will have the intrinsic value of 30 cents.

At any point in the life of an option, puts and calls are classified based on their intrinsic value. The same option can be classified differently throughout the life of the option.

- *In-the-money.* In trading jargon, an option, whether a call or a put that has intrinsic value (i.e., currently worthwhile to exercise), is said to be in-the-money by the amount of its intrinsic value. At expiration, the value of the given option will be whatever amount, if any, the option is in-the-money by. A call option is in-the-money when the strike price is below the underlying future price. A put option is in-the-money when the strike price is greater than the underlying future price.

- *Out-of-the-money.* All call options are said to be out-of-the-money if the option strike price is currently above the underlying future prices. A put option is out-of-the-money if the strike price is below the underlying futures prices. Out-of-the-money options have no intrinsic value.
- *At-the-money.* If a call or put option strike price and the underlying futures prices are the same, or approximately the same, the option is at-the-money. At-the-money options have no intrinsic value.

To repeat, an option's value at expiration will be equal to its intrinsic value: the amount by which it is in-the-money. This is true for both puts and calls.

Calculating an Option's Intrinsic Value

Mathematically it's relatively easy to calculate an option's intrinsic value at any point of time in its life. The mathematical function is basic subtraction. The two factors involved in the calculation are the option strike price and current underlying future price. For call options, the intrinsic value is calculated by subtracting the call strike price from the underlying future price.

- If the difference is a positive number (the call strike price is less than the underlying future price) there is intrinsic value. Example: 52 cent strike price December soybean oil call when December soybean oil future is trading at 53 cents ($\$0.53 - \0.52 strike price = $\$0.01$ of intrinsic value).
- If the difference is 0 (the call strike price is equal to the underlying future price), then that call option has no intrinsic value. Example: 52 December soybean oil call when December soybean oil future is trading at 52 Cents ($\$0.52 - \0.52 strike price = $\$0.00$ of intrinsic value).
- If the difference is a negative number (the call strike price is greater than the underlying future price) then the call option would have no intrinsic value. Example: 52 Cent Strike price December soybean oil call when December soybean oil future is trading at 50 % ($\$0.50 - \0.52 strike price = $\$0.00$ of intrinsic value).

Note that the intrinsic value is always a positive number (i.e., an option can't have negative intrinsic value). Therefore, you can say the call option in this example is out-of-the-money by 2 cents, but you should not say that it has an intrinsic value of minus 2 cents.

For put options, the intrinsic value is calculated by subtracting the underlying futures price from the put strike price.

- If the difference is a positive number (the put strike price is greater than the underlying future price), there is intrinsic value. Example: \$6.50 March wheat put when the March wheat future is trading at \$6.20 ($\$6.50 - \$6.20 = \0.30 of intrinsic value).
- If the difference is 0 (the put strike price is equal to the underlying future price), then the put option has no intrinsic value. Example: \$6.50 March wheat put when March wheat future is trading at \$6.50 ($\$6.50 - \$6.50 = 0$ of intrinsic value).
- If the difference is a negative number (the put strike price is less than the underlying future price), then the put option currently has no intrinsic value. Example: \$6.50 March wheat put when March wheat future is trading at \$6.75 ($\$6.50 - \$6.75 = 0$ intrinsic value).

Note that the intrinsic value is always a positive number (i.e., the option can't have a negative intrinsic value). Therefore, you can say the put option in this example is out-of-the-money by 25% of the intrinsic value.

At the expiration of a call or put option, the option's premium consists entirely of its intrinsic value—the amount that is in-the-money.

Time Value

If an option doesn't have intrinsic value (either it is at-the-money or out-of-the-money), that option premium would be all time value. Time value is the difference between the total premium and the intrinsic value.

Although the mathematics of calculating time value is relatively easy when you know the total premium and the intrinsic value, it is not quite as easy to understand the factors that affect it.

Time value, sometimes called extrinsic value, reflects the amount of money buyers are willing to pay in expectation that an option will be worth exercising at or before expiration. One of the factors reflects the amount of time remaining until the option expires. For example, let's say that on a particular day in mid-May the November Soybeans futures price is quoted as \$12.30. Calls with a strike price of \$12.50 on November soybean futures are trading at a price of 12 cents per bushel. The option is out-of-the-money and therefore has no intrinsic value. Even so, the call option has a premium of 12 cents (the option time value or extrinsic value) and a buyer may be willing to pay 12 cents for the option.

Why? Because the option still has five months to go before it expires in October, and during that time the underlying future price might rise above

\$12.62 (strike price \$12.50 + \$0.12 premium), and the holder of the option will realize a profit.

At this point in the discussion, it should be apparent why at expiration an option's premium will consist only of its intrinsic value. Such an option no longer has a time value—for the simple reason that there is no longer any time remaining.

Let's now go to the out-of-the-money call, which, five months prior to expiration, commanded a premium of 12 cents per bushel. The next question is: why 12 cents? Why not 10 cents? Or 30 cents? In other words, what are the factors that influence the option's time value? While interest rates and the relationship between the underlying future price and the option strike price affect time value, the two primary factors are:

1. the length of time remaining until expiration;
2. the volatility of the underlying future price.

Length of Time Remaining until Expiration

All else remaining equal, the more time the option has until expiration, the higher its premium. The time value is usually expressed in the number of days until expiration. This is because it has more time to increase in value. (To employ an analogy, it's safer to say it will rain within the next five days than to say it will rain within next two days.) Again, assuming all else remains the same, an option's time value will decline (erode) as it approaches expiration. This is why options are sometimes described as “decaying assets”.

Also note that the rate of decay increases as you approach expiration. In other words, the option buyer loses a larger amount of time value each day. Therefore, hedgers who buy the options may want to consider offsetting their long option position prior to the heavy time-value decay and replace it with another risk management position in the cash, futures, or options market.

Volatility of the Underlying Futures Price

All else remaining the same, option premiums are generally higher during periods when the underlying future prices are volatile and there is more price risk involved and therefore a greater need for price protection. The cost of the price insurance associated with options is greater, and thus the premium will be higher. Given that an option may increase in value when futures prices are

more volatile, buyers will be willing to pay more for the option. And, because an option is more likely to become worthwhile to exercise when prices are volatile, sellers require higher premiums. Thus an option with 90 days to expiration might command a higher premium in a volatile market than an option with 120 days to expiration in a stable market.

Other Factors Affecting Time Value

Option premiums also are influenced by the relationship between the underlying future price and the option strike price. All else being equal (such as volatility and length of time to expiration), and at-the-money option has more time value than an out-of-the-money option. For example, assume a soybean oil future is 54 cents per pound. A call with a 54 cent strike price (an at-the-money call) will command a higher premium than an otherwise identical call with a 56 cent strike price. Buyers, for instance, might be willing to pay 2 cents for the at-the-money call, but only 1.5 cents for the out-of-the-money call. The reason is that the at-the-money call stands a much better chance of eventually moving towards being in-the-money.

An at-the-money option is also likely to have more time value than an option that is substantially in-the-money (referred to as a “deep” in-the-money option). One of the attractions of trading options is leverage: the ability to control relatively large resources with a relatively small investment. An option will not trade for less than its intrinsic value, so when an option is in-the-money, buyers generally will have to pay over and above its intrinsic value for the option rights. A deep in-the-money option requires a greater investment and compromises the leverage associated with the option. Therefore, the time value of the option erodes as the option becomes deeper in-the-money.

Generally, for a given time to expiration, the greater an option’s intrinsic value, the less time value it is likely to have. At some point, a deep in-the-money option may have no time value, even though there is still time remaining until expiration.

Another factor influencing time value is interest rates. Although the effect is minimal, it is important to realize that, as interest rates increase, time value decreases. The opposite is also true: as interest rates decrease, time value increases.

In the final analysis, the three most important things you need to know about option premium determination are:

1. Premiums are determined by supply and demand, through there is competition between option buyer and seller.
2. At expiration, an option will only have intrinsic value (the amount that can be realized by exercising the option). If an option has no intrinsic value, it will expire as worthless.
3. Prior to expiration, an option's premium will consist of its intrinsic value (if any) plus its time value (if any). If an option has no intrinsic value, its premium prior to expiration will be entirely its time value.

Option Pricing Model

As you become more familiar with option trading, you will discover there are computerized options pricing models that take into consideration the pricing factors we have discussed here and calculate theoretical option premiums. These theoretical option values may or may not match what an option actually trades for. So, regardless of what a computer pricing model may say, the final price of an option is discovered through the exchange trading platforms.

These computer programmes also determine how much risk the particular option position carries. This information is used by professional option traders to limit their risk exposure. Some of the different option variables used to measure risk are delta, gamma, theta, and vega:

- *Delta*. The option variable you may hear discussed most often is delta which is used to measure the risk associated with future position. Delta measures how much an option premium changes given a unit change in the underlying future price.
- *Gamma*. This variable measures how fast an option's delta changes as the underlying future price changes. Gamma can be used as a gauge to measure the risk associated with an option position in much the same way as the delta is used to indicate the risk associated with the future position.
- *Theta*. The option pricing variable, theta, measures the rate at which an option's time value decreases. Professional option traders use theta when selling options to gauge profit potential or when buying options to measure their exposure to time decay.
- *Vega*. The option variable that measures market volatility, or the riskiness of the market.

As a novice to options trading, it is good to be aware of these terms, but more than likely you won't use them. Typically, these pricing variables are used by professional option traders and commercial firms.

What Can Happen to an Option Position?

Earlier in the chapter, we went over several examples in which the intrinsic value of the option was determined based on whether or not an option was exercised. Hopefully, this gave you a better understanding of how to determine the intrinsic value of an option. But, in reality, there are three different ways of exiting an option:

- offset;
- exercise;
- expiration.

The most common method of exit is by offset.

Offsetting Options

Options that have value are usually offset before expiration. This is accomplished by purchasing a put or call identical to the one you originally sold or by selling the one you originally bought. For example, assume you need protection against rising wheat prices. At this time, July wheat futures are trading at \$6.75 per bushel and the \$6.70 July wheat call is trading at 12 cents per bushel (\$0.05 intrinsic value + \$0.07 time value). You purchase the July wheat call and in the future the July wheat moves to \$7.00 and the \$6.70 call for its current premium of 33 cents. The difference between the option purchase price and sale price is 21 cents per bushel (\$0.33 premium received when sold, -\$0.12 premium paid when bought), which can be used to reduce the cost of wheat you are planning to buy.

Offsetting an option before expiration is the only way you'll recovery any remaining time value. Offsetting also prevents the risk of being assigned a future position (exercised against) if you originally sold an option.

Your net profit or loss, after a commission is deducted, is the difference between the premium paid to buy (or receive to sell) the option or premium you receive or (pay) when you offset the option. Market participants face the risk that there may not be an active market at the time they choose to offset, especially if the option is deep out-of-the-money or the expiration date is near.

Exercising Options

Only the option buyer can exercise an option and can do so at any time during the life of the options, regardless of whether it is a put or call. When an option position is exercised, both the buyer and seller of the option are assigned a future position.

Here is how it works. Option buyers first notify their broker that they want to exercise an option. The broker then submits an exercise notice to the clearing house. An exercise must be submitted by 6.00p.m. CT on any business day so that the exercise process can be carried out that night.

Once the clearing house receives an exercise notice, it creates a new futures position at the strike price for the option buyer. At the same time, it assigns an opposite futures position at the strike price to a randomly selected clearing member who sold the same option (see Table 3.22). The entire procedure is completed before trading opens the following business day.

The option buyer would exercise only if the option is in-the-money; otherwise he or she would experience the market loss. For example, suppose you are holding a \$6.50 corn put option and the corn future market reaches as \$7.00. By exercising your \$6.50 corn put option you would be assigned a short future position at \$6.50. To offset the position you would end up by buying corn future at \$7.00, thus experiencing a 50 cent loss.

Because buyers exercise options when they are in-the-money, the opposite futures position acquired by the option seller upon exercise will have a built in loss. But this does not mean that the option seller will incur the net loss. The premium the seller received for writing the option may be greater than the loss in the future position acquired in exercise. For example, the option seller receives a premium of 25 cents per bushel for writing a soybean call option with a strike price of \$11.50. When the underlying future price climbs to \$11.65 the call is exercised. The call seller will thus acquire a short futures position at the strike price of \$11.50. Since the current future price is \$11.65, there will be a 15 cent per bushel loss in the future position. However, since that is less than the 25 cents received for writing the option, the option seller still has a 10 cent per bushel net profit. This profit can be locked in by liqui-

Table 3.22 Future position after the option exercise

	Call option	Put option
Buyer assumes	Long future position	Short future position
Seller assumes	Short future position	Long future position

dating the short future position through the purchase of an offsetting future contract.

On the other hand, suppose the future price at the time the option exercised had been \$11.85 per bushel. In this case, a 35 cent loss on the short future position acquired through exercise would increase the 25 cent premium received from writing the call. The option seller has a 10 cent per bushel net loss. And, had the future price being higher, the net loss would have been greater.

The only alternative an option seller has to avoid exercise is to offset their short option position by buying an identical option prior to being assigned an exercise notice by the clearing house. Once the notice of exercise has been assigned, the alternative of purchasing an offsetting option is no longer available. The only alternative at this point will be to liquidate the future position acquired through exercise by offsetting the assigned future contract.

If, for some reason, you are holding an in-the-money option at expiration, the clearing house will automatically exercise it unless you give notice otherwise.

Letting an Option Expire

The only other choice you have to exit an option position is to let it expire—simply do nothing, anticipating it will have no value at expiration (will expire as worthless). In fact the right to hold the option up until the final date of exercising is one of the features that makes the option attractive to many. Therefore, if the change in price you anticipated does not occur, or if the price initially moves in the opposite direction, you have the assurance that the maximum you can lose in this transaction is the premium paid for the option. On the other hand, option sellers have the advantage of keeping the entire premium they earned, provided it doesn't move in-the-money by expiration.

Note that as an option trader, especially as an option buyer, you should not lose track of your option value, even if it is out-of-the-money (without intrinsic value) because you still may be able to recover any remaining time value through offset.

Even hedgers who use options for price protection may offset their long option position sooner than originally expected. The time value recovered through offset is lower than the expected cost of risk management. In this situation, hedgers usually take another position in the cash, future, or option market to ensure they still have price protection for the time period they want.

Option Hedging Strategies for Buying Commodities

Introduction to Risk Management Strategies

The primary purpose here is to familiarize you with many different ways in which options on agriculture futures can be used to achieve specific objectives. Upon completion of this section you will be able to:

- recognize situations in which the option is to be exercised;
- determine the most appropriate strategy to accomplish the particular goal;
- calculate the dollar and cents outcome of any given strategy;
- compare options with alternative methods of pricing and risk management, such as future hedging and forward contracting;
- explain the risk that may be involved in any particular strategy.

The strategies that are covered include those for:
commodity buyers:

1. buy futures for protection against rising prices;
2. buy calls for protecting against rising prices and utilizing opportunity if prices decline;
3. sell puts to lower your purchase price in a stable market;
4. buy a call and sell the put to establish a purchase price range;
5. cash purchase without risk management.

commodity sellers:

1. sell futures for protection against falling prices;
2. buy puts for protecting against falling prices and utilizing opportunity if prices rally;
3. sell calls to increase your selling price in a stable market;
4. buy a put and sell the call to establish a purchase price range;
5. cash sale without risk management.

If you could describe options in one word, it would be “versatile”. The better you understand options, the more versatile they become. You start to recognize opportunities for using options that otherwise would not have

occurred to you. And, of course, the better you understand options, the more skilful you become in using them.

The key to using options successfully is an ability to match an appropriate strategy to a particular objective at a given time: choosing the right tool to do a given job. Naturally no individual is likely to use all possible option strategies for the simple reason that no individual is likely to have a need for every possible strategy. However, in the pages that follow I will suggest several situations in which the knowledge you have acquired about options will give you a significant advantage over those who are not familiar with the many benefits they offer.

As indicated, the attractiveness of options lies in their versatility:

- they can be used as protection against rising prices or against declining prices;
- they can be used to achieve short term objectives or long term objectives;
- they can be used conservatively or aggressively.

The strategy discussions in this section are intended to serve a dual purpose. The first is to demonstrate the versatility of options and help you attain a higher level of familiarity with the mechanism of option trading. The second is to provide a reference guide to option strategies so that, as opportunities become available for using options, you can readily refer to the specific strategies that may be appropriate. Rather than attempt at the outset to become the master of every strategy, I suggest focusing your attention on those strategies that seem more pertinent to your business and that correspond most closely to your objectives.

Why Buy Or Sell Options?

There are so many things that you can do with options that the reasons for buying and selling are as diversified as the marketplace itself. In the case of purchasing options, hedgers typically buy them to achieve price protection. If you are worried prices will rise before you have a chance to purchase the physical commodity, you would buy a call option. A call option will allow you to establish a ceiling price for a commodity you are planning to purchase. On other hand, if you are worried prices will fall before you have a chance to sell your physical product or crop, you would buy a put option, which allows you to establish a minimum (floor) selling price.

In both cases you are not locked in at the ceiling or floor price as you are with future or forward contracting. If the market moves in a favourable direction after purchasing an option, you can abandon it and take advantage of the current price. That is different from a future hedge, which locks in a specific price. However, the cost of the option is deducted from (or added to) the final sale (or purchase) price.

A selling option is a little different. The reason people sell options can be stated in just a few words: to earn the option premium. This applies to both the writing of calls and of puts. Whether to write a call or a put depends largely on one's cash market position or price outlook.

Generally, a call option is written by those who do not expect a substantial price increase. They may even be bearish in their price expectation. In any case they hope that the underlying future price will not rise to a level that will call the option to be exercised. If the option expires without being exercised, the option seller will earn the full option premium.

Puts, on the other hand, are generally sold by those who do not expect a substantial decrease in price. They may even have a bullish outlook. They hope the underlying future price will not fall to a level that will cause the option to be exercised. If a put expires without being exercised, the option seller will earn the full option premium.

Instead of waiting, crossing your fingers in a hope an option will not be exercised, a seller will always offset the option position before it expires. Under this scenario, the option seller will earn the price difference between the sale price and purchase price.

Which Option to Buy or Sell?

A common denominator of all option strategies is the need to decide specifically which option to buy or sell: an option with only a short length of time remaining until expiration, or one with a long length of time? An option that is currently out-of-the-money, at-the-money, or in-the-money? As you know, the option premium reflects both the time value remaining until expiration and the option strike price relation to current underlying quoted future prices. It follows that the different options, therefore, have different reward characteristics. Generally, the decision as to which option contract month to buy or sell in will be dictated by the time frame of your objective. For example, if it is summer and your objective is against declining soybean prices between now and harvest, you will likely want to purchase a November put option. On the

other hand, if it is winter and you want protection from a probable corn price decrease during the spring, you would probably want to purchase a May put option. As we discussed in option pricing, the longer the time until the option expires, the higher the premium, providing all other factors are equal.

When it comes to choosing the option strike price, however, there is no easy rule of thumb. Your decision may be influenced by the following considerations. In your judgement, what is likely to happen to the price of underlying future contracts? How much risk are you willing to accept? And (if your objective is price protection), would you rather pay a smaller premium for less protection or a larger premium for more protection? Options with a wide range of strike price provide a wide range of alternatives. The following brief examples will explain how and why.

Example 1 Assume it is late spring and you would like protection against lower soybean prices at harvest. The November future price is currently quoted at \$11.50. For a premium of 25 cents, you may be able to purchase a put option that lets you lock in a harvest-time selling price of \$11.50 plus your local basis. If the price subsequently declines, the higher priced option provides you with more protection; but, if the price rises, the saving on the cost of the lower-priced option will add another 10 cents (the difference in the premiums) to your net selling price. In effect, this is similar to deciding whether to buy an automobile insurance policy with a small deductible or a large deductible.

Example 2 Assume you decided to purchase a corn call option for protection against a possible price increase. If the May future price is currently \$5.70 and you pay 8 cents for an out-of-the-money call with a \$5.80 strike price, you will be protected from any price increase above \$5.88 (strike + premium). But if you pay the premium of 15 cents for an at-the-money-call option with a strike price of \$5.70, you will be protected from any price increase above \$5.85 (strike price + premium). The out-of-the-money option is cheaper than the at-the-money option. Your out-of-pocket expense is the 8 cent premium (rather than the 15 cent premium) if the price declines rather than increases.

Example 3 In anticipation that the wheat price will remain steady or decrease slightly over the next four months, you decide to sell a call option to earn the

option premium. If you are strongly bearish about the price outlook, you might want a premium of 17 cents by writing an at-the-money \$6.40 call. But, if you are only mildly bearish or neutral about the price outlook, you might wish to write an out-of-the-money \$6.50 call at a premium of 13 cents. Although the premium income is less, the out-of-the-money call gives you a 10 cent cushion against the chances of rising prices. That is, you would still retain the full 13 cents premium if, at expiration, the futures price had risen to \$6.50.

In each of these illustrations—and indeed in every option strategy—the choice is yours. The important thing is to be aware of the choices and how they affect the risks and rewards.

The Buyers of Commodities

Commodity buyers are responsible for the eventual purchase of physical raw commodities (e.g., corn, soybean, wheat, oats) or derivatives of raw commodities (e.g., soybean meal, soybean oil, fructose flour). The commodity buyer can be a food processor, feed manufacturer, feedlot, livestock producer, grainer, or importer. They share commodity risk, namely rising prices. Additionally, commodity buyers share a common need: price risk management. The following illustrates a variety of strategies with varying degrees of risk management that can be used by commodity buyers.

Strategy 1: Buying Futures

Protection against rising prices The current time period is mid-summer and you need to purchase wheat during the first half of November. The December wheat futures are trading at \$6.50 per bushel. Your business can realize a profit at this price level but may sustain a loss if the prices rally much higher. To lock in this price, you take a long position in December wheat futures. Although you are protected if the price moves higher, you will not be able to benefit should the prices move lower. Based on historical records in your area, you expect the basis to be about 10 cents under the December wheat future price. As a buyer of commodities, your purchase price will improve if the basis weakens and worsen if the basis strengthens. For example, if the basis turns out at 5 cents higher than expected, and if the basis weakens to 20 cents under, then your purchase price will be 10 cents lower than expected.

Table 3.23 Strategy 1: example results (\$)

Dec wheat futures price	Basis	Cash price	Long future gain / loss	Actual buying price
6.00	-0.10	5.90	+0.50	6.40
6.25	-0.10	6.15	+0.25	6.40
6.50	-0.10	6.40	0.00	6.40
6.75	-0.10	6.65	-0.25	6.40
7.00	-0.10	6.90	-0.50	6.40

Action In August you purchase a December wheat futures contract at \$6.50 per bushel.

$$\begin{aligned} \text{Expected purchase price} &= \text{Future price} \\ &+ / - \text{expected basis } \$6.50 - \$0.10 = \$9.40 / \text{bushel} \end{aligned}$$

Results Assuming the basis turns out to be 10 cents under December futures in November, and December wheat futures move above \$6.50 per bushel, the higher price you pay for the physical wheat will be offset by a gain in your future position. If December wheat futures move below \$6.50 per bushel, you will pay a lower price for the physical wheat, though you will have a loss in your long future position. Note the difference in price scenarios for the November time period. Regardless of whether the December wheat futures move higher or lower, the effective purchase price will be \$6.40 per bushel provided that the basis turns out to be 10 cents under. A change in the basis affects the purchase price (Table 3.23).

Strategy 2: Buying Call Options

Protection against higher prices and opportunity if price declines Assume you are the buyer who needs to establish the wheat purchase price for November delivery. The time is August and the December wheat future price is 6.50 per bushel. At this level you decide to use options to protect your flour purchase price and related profit margins against a significant rise in the price of wheat. By buying a call option you'll be protected from a price increase yet retain the downside opportunity should the price fall between now and November.

Table 3.24 Premium for the December wheat call and put options (\$)

Option strike price	Call option premium	Put option premium
6.10	0.41	0.01
6.20	0.33	0.04
6.30	0.27	0.08
6.40	0.21	0.12
6.50	0.15	0.16
6.60	0.11	0.22
6.70	0.07	0.28
6.80	0.03	0.34
6.90	0.01	0.41

The cash market price for wheat in your region is typically about 10 cents below the December future price during November. This means the normal basis during late fall is 10 cents under, and, given the current market condition, you expect this to hold true this year. Therefore, if the December future price in November is \$6.50, the cash price in your supplier's buying region is expected to be about \$6.40 per bushel (Table 3.24).

Expected buying price To compare the price risk exposure for different call option strikes simply use the following formula:

$$\text{Maximum (ceiling) buying price} = \text{call strike price} + \text{premium paid} + / - \text{basis}$$

As shown in Table 3.25, greater price protection involves somewhat higher cost.

Action After considering the various option alternatives you purchase the \$6.50 call for 15 cents, which provides protection against the current market price level.

Scenario 1: Price Rise

If prices rise, and assuming the basis remains unchanged at 10 cents under, you will pay a maximum of \$6.55 per bushel for wheat. That is, the option strike price (\$6.50) plus the premium paid for the option (15 cents) less the basis (10 cents).

Assume the December futures price has risen to \$7.50 and your supplier is offering cash wheat at \$7.40 (the \$7.50 futures price – the \$0.10 basis). With the future price at \$7.50, the call option with a strike price of \$6.50 can be sold for at least its intrinsic value of \$1.00. Deducting the 15 cent premium paid for the option gives you a net gain of 85 cents, providing you with an effective buying price of \$6.55 per bushel.

Scenario 2: Price Decrease

If December wheat future prices decrease below the \$6.50 strike price, your option will have no intrinsic value but may have some remaining time value. To receive the remaining time value and lower the purchase price, you should attempt to offset the option. Your net wheat floor price will be directly related to the cash price for wheat plus the premium you initially paid for the option minus any time value you recover. If the option has no time value you can allow the option to expire as worthless.

For example, assume the December wheat futures price has decreased to \$6.00 at the time you procure your cash wheat and your supplier is offering you a local price of \$5.90 (the future price less the basis of 10 cents under). You allow the option to expire since it has no intrinsic or time value. The net price you pay for wheat equals \$6.05 (the \$5.90 cash price + the \$0.15 option premium paid). Whether the market price has gone up or down, the following formula allows you to calculate the net price for the basic ingredient (wheat in this scenario) you are buying:

$$\begin{aligned}
 & \text{Future price when } you \text{ purchase the ingredient} \\
 & + / - \text{local basis at the time of your purchase} \\
 & + \text{premium paid for the option} \\
 & - \text{premium received when option is offset} \\
 & = \text{net purchase price}
 \end{aligned}$$

Results Note the different scenarios for the November time period. Regardless of the price increase in cash wheat, the maximum purchase price is \$6.55 per

Table 3.25 Comparison between a \$9.40 call and a \$9.50 call

Call	+	Premium	–	Basis	=	Ceiling
\$6.40	+	\$0.21	–	\$0.10	=	\$6.51
\$6.50	+	\$0.15	–	\$0.10	=	\$6.55

bushel because of the increasing profit in the long call option position. As prices decline, the wheat buyer continues to improve on the effective buying price (Table 3.26).

Selling Put Options

Lower your buying price in a stable market If you anticipate the market remaining stable, you can lower the buying price of your ingredients by selling (going short) a put option. By selling a put option as a commodity buyer, you can lower the purchase price of your ingredient by the amount of premium received provided the market remains relatively stable.

If the future market falls below the put strike price, you'll be able to buy the cash commodity at a lower price than you originally expected (the cash and future market generally move parallel to each other), but you will lose on the short put. If the future market falls below the strike price by more than the premium collected, your losses on the short put offset the lower price paid to your supplier. If the future market rallies, the only protection you have against the higher cash price is the premium collected from selling the put. Also, because selling options involves market obligation, the performance bond/margin fund must be posted with your broker.

Action Assume again you are a wheat buyer for a food manufacturer that needs to establish a price for a mid-November delivery. It is August, the December wheat futures price is \$6.50 per bushel, and you expect wheat price to trade in a narrow range through the next several months. Also assume out-of-the-money December wheat puts (i.e., the strike price is \$6.30) are trading at 8 cents per bushel. The expected basis is 10 cents under December. You decide to sell December \$6.30 puts to reduce the actual price you pay for the cash wheat between now and November.

Table 3.26 Strategy 2: example results (\$)

Dec wheat futures price	Basis	Cash price	Long call gain/loss	Effective buying price
6.00	-0.10	5.90	+0.15	6.05
6.25	-0.10	6.15	+0.15	6.30
6.50	-0.10	6.40	+0.15	6.55
6.75	-0.10	6.65	-0.10	6.55
7.00	-0.10	6.90	-0.35	6.55

Table 3.27 Selling put options: example results

Dec wheat futures price – actual basis	=	Cash price	+/-	Short put gain/loss	=	Net buying price
\$6.00 – \$0.10	=	\$5.90	+	0.22(L)	=	\$6.12
\$6.25 – \$0.10	=	\$6.15	–	0.03(L)	=	\$6.12
\$6.50 – \$0.10	=	\$6.40	–	0.08(L)	=	\$6.32
\$6.75 – \$0.10	=	\$6.65	–	0.08(G)	=	\$6.57
\$7.00 – \$0.10	=	\$6.90	–	0.08(G)	=	\$6.82

To calculate the expected floor purchase price simply use the following formula:

$$\begin{aligned} \text{Minimum floor buying price} &= \\ & \text{put strike price} - \text{premium received} + / - \text{expected basis} \\ & \$6.30 \text{ put strike price} - \$0.08 \text{ premium} - \$0.10 \text{ basis} = \$6.12 \end{aligned}$$

With this strategy, the effective purchase price will increase if the future price rises above the put strike price. Once that happens, your protection is limited to the premium received and you will pay the higher price for wheat in the cash market.

Rights Your effective buying price will depend on the actual future price and basis (10 cents under as expected) when you purchase your cash wheat. In Table 3.27, the net wheat price is a result of various future prices.

As the equation indicates, after adjusting for the basis, the premium received from the sale of the puts reduces the effective purchase price of the wheat. But there are risks in the selling options. If the price falls below the strike price, there is a possibility you will be exercised against and assigned the long future position at any time during the life of the option position. This would result in the position loss being equal to the difference between the strike price and the future market price. This loss offsets the benefit of a falling cash market, effectively establishing a floor price level. In contrast, if the market price increases, your upside protection is limited only to the amount of premium collected.

Buy a Call and Sell a Put

Establish a buying price range This long hedging strategy provides you with a buying price range. Purchasing a call option creates a ceiling price and selling a put establishes a floor price. The strike price of the option determines

Table 3.28 The premiums for December wheat call and put options (\$)

Strike price	Call option premium	Put option premium
6.10	0.41	0.01
6.20	0.33	0.04
6.30	0.27	0.08
6.40	0.21	0.12
6.50	0.15	0.16
6.60	0.11	0.22
6.70	0.07	0.28
6.80	0.03	0.34
6.90	0.01	0.41

your price range. You will choose a lower strike price for the put option (i.e., a floor price) and a higher strike price for the call option (i.e., a ceiling price). As with all strategies, the range selected depends upon your company's price objective and risk exposure. The premium received from selling the put allows you to reduce the premium cost of the call. You effectively lower the ceiling price by selling the put. Once more, you assume that you are buying the wheat for your firm and decide to use a wheat option to establish a price range between August and November that is generally 10 cents under December wheat futures (Table 3.28).

Action You first need to calculate the buying price range that fits your risk tolerance level. This is done by using the following formulas:

Maximum purchase (ceiling) price =
 call strike price + call premium paid –
 put premium received + / – expected basis.

Maximum (floor) purchase price =
 put strike price + call premium paid –
 put premium received + / – expected basis.

Using these formulas and various option premiums you can calculate different buying ranges based upon the strike price chosen. The greater the difference between the call and put strike price, the wider the purchase price range. Conversely, a smaller difference in the strike price will result in a narrower purchase price range.

Table 3.29 Buy a call and sell a put: example result (\$)

Dec wheat futures price – actual basis	=	Cash price	Long \$7.50 call gain/loss	Short \$7.30 put gain/loss	Net buying price
6.00 – 0.10	=	5.90	+0.15	+0.22	6.27
6.25 – 0.10	=	6.15	+0.15	–0.03	6.27
6.50 – 0.10	=	6.40	+0.15	–0.08	6.47
6.75 – 0.10	=	6.65	–0.10	–0.08	6.47
7.00 – 0.10	=	6.90	–0.35	–0.08	6.47

After considering various options, you decided to establish the buying price range by purchasing a \$6.50 call for 15 cents and selling a \$6.30 put for 8 cents. The call option was initially at-the-money and the put option was initially out-of-the-money.

Results Regardless of what the future market does, your net buying price will be no more than \$6.47 (a \$6.50 call strike + a \$0.15 call premium paid – a \$0.08 put premium received – a \$0.10 basis) and no less than \$6.27 (a \$7.30 put strike + a \$0.15 call premium paid – a \$0.08 put premium received – a \$0.10 basis), subject to any variation in the basis. The price range is 20 cents because this is the difference between the call and put strike prices.

Looking at the net results based on different future prices scenarios in Table 3.29 confirms the establishment of the buying price range.

Comparing Commodity Purchasing Strategies

A commodity buyer should realize that there isn't a perfect strategy for all firms or for all market conditions. Different economic conditions require different purchasing strategies. Therefore, an astute commodity buyer should become familiar with all of the available purchasing strategies. He or she should learn how to evaluate and compare the strategies, and sometimes realize that a strategy may need to be revised, even in the middle of a purchasing cycle, due to changing market conditions. Each firm with its own risk/reward profiles will have to make a decision about which strategy is best for its needs.

Table 3.30 compares four purchasing strategies involving futures or options and one strategy without price risk management. Each of the strategies has strengths and weaknesses. Note that all the following strategies being compared assume a basis of 10 cents under a December wheat futures contract. If the basis turns out to be anything other than 10 cents under December contracts, the effective purchase price will be different. A stronger basis would

increase the purchase price and a weaker than expected basis would lower the effective purchase price.

Long futures The long future position is the most basic price risk management strategy for the commodity buyer, who can “lock in the price level” in advance of actual purchase. It provides protection against the risk of rising prices but does not allow improvement in the purchase price should the market decline. This position requires payment to broker the commission as well as costs associated with maintaining the performance bond/margin account. In Table 3.30 the long future position fares the best when the market moves higher (i.e., when the price risk occurs).

Long call options The long call option position provides protection against rising commodity prices but also allows the buyer to improve on the purchase price if the market declines. The long call position establishes the maximum (ceiling) price level. The protection and opportunity of a long cost option position comes at a cost: the call option buyer must pay the option premium at the time of purchase. In Table 3.30 you can see how the Long (buying) Call option strategy provides upside price protection, similar to the long future position except to the cost. Unlike the long future position, the long call option nets a better purchase price when the market declines and does not require a performance bond/margin.

Short put options Although the short put option position is the riskiest of the strategies, it provides the best purchase price in a stable market. However, if the market declines, the put option establishes the minimum (floor) purchase price level. The worst case scenario for this strategy is if the market rallies because protection is limited to the premium collected for selling the put. The short put strategy requires a performance bond/margin.

Table 3.30 Strategies comparison (\$)

Dec wheat futures price	Long futures	Long call	Short put	Long call/ short put	Do nothing
6.00	6.40	6.05	6.12	6.27	5.90
6.25	6.40	6.30	6.12	6.27	6.15
6.50	6.40	6.55	6.32	6.47	6.40
6.75	6.40	6.55	6.57	6.47	6.65
7.00	6.40	6.55	6.82	6.47	6.90

Long call option and short put option By combining the short put position with the long call position, the commodity buyer establishes a lower ceiling price level because of the premium received by selling the put. However, the cost of this benefit is that the short put position limits the opportunity of lower prices by establishing a floor price level. Effectively, the commodity buyer established a purchase price range with this strategy, which is determined by the strike price and therefore can be adjusted (widened or narrowed) by choosing an alternative to this price. After the long futures position, this strategy provides the most protection against rising prices.

Do nothing Doing nothing to manage purchasing price risk is the simplest strategy for the commodity buyer—but also the most dangerous should the market rally. Doing nothing will yield the best purchase price as the market declines, but it provides zero risk management against a rising market.

Other purchasing strategies There are many other purchasing strategies available to a commodity buyer. These may involve futures, options, or cash market positions, and each will have its own set of advantages and disadvantages.

Option hedging strategies for selling commodities

Commodities sellers, similar to commodities buyers, are potential hedgers because of their need to manage price risk. Commodity sellers are individuals or firms responsible for the eventual sale of the physical raw commodities (e.g. wheat, rice, corn) or derivatives of raw commodities (e.g. Soybean wheat, floor). For example commodity seller can be farmer, grain elevator, grain cooperatives and exporters. Although they have different function in agriculture industry, they share a common risk –falling prices and a common need to manage that price risk .The following strategies for commodity sellers provide different risk management risk.

Strategy 1: Selling Futures

As a soybean producer, who has just completed planting, you are concerned that the price will decline between spring and harvest. With November soybean futures currently trading at \$11.50 per bushel and

your expected harvest basis of 25 cents under November soybean futures, the market will be at a profitable price level for your farm operation. To lock in this price level, you take a short position in November soybean futures. Although you are protected should the price move lower than \$11.50, this strategy will not allow you to improve your selling price if the market moves higher. A short future position will increase in value to offset a lower cash selling price as the market declines and it will decrease in value to offset a higher cash selling price as the market rallies. Basically a short future position locks in the same price level regardless of which direction the market moves.

The only factor that will alter the eventual selling price is a change in the basis. If the basis turns out to be stronger than the expected 25 cents under, then the effective selling price will be higher. For example, if the basis turns out to be 18 cents in November at the time you sell your soybeans, the effective selling price will be 7 cents better than expected. If the basis weakens to 31 cents under at the time of the cash soybean sale, then the expected price will be 6 cents lower than expected.

Action In the spring you sell November soybean futures at \$11.50 per bushel.

Expected selling price =

future price + / - expected basis = \$11.50 - \$0.25 = \$11.25 *per* bushel.

Results Assuming the November soybean futures drop below \$11.50 at harvest and the basis is 25 cents under, as expected, the lower price you receive for your cash soybeans would be offset by a gain in your short futures position. If November soybean futures rally above \$11.50 and the basis is 25 cents under, the higher selling price you receive for soybeans will be offset by a loss on the short future position.

Note the different price scenarios for the harvest time period (October) in Table 3.31. Regardless of the November soybean futures moving higher or lower, the effective cash selling price will be \$11.25 per bushel if the basis is 25 cents under. Any change in the basis will alter the effective selling price.

If the basis were stronger (20 cents under) when futures were at \$10.50, the effective selling price would have been \$11.30. If the basis weakens (30 cents under) when futures were at \$12.50, the effective selling price would have been \$11.20.

Table 3.31 Soybeans: selling futures example (\$)

Nov soybean futures +/- basis = cash price	+/- short future gain / loss	= actual selling price
\$10.50 – \$0.25 = \$10.25	+\$1.00	= \$11.25
\$11.00 – \$0.25 = \$10.75	+\$0.50	= \$11.25
\$11.50 – \$0.25 = \$11.25	\$0.00	= \$11.25
\$12.00 – \$0.25 = \$11.75	–\$0.50	= \$11.25
\$12.50 – \$0.25 = \$12.25	–\$1.00	= \$11.25

Strategy 2: Buying Put Options

Protection against lower prices and opportunity if prices rally As a soybean producer whose crop has just been planted, you are concerned that there may be a sharp decline in prices by the harvest in October. You would like to have protection against lower prices without giving up the opportunity to profit if prices increase. At the present time, the November futures price is quoted at \$11.50 per bushel. The basis in your area during October is normally 25 cents under the November soybean future price. Thus, if the November future price in October is \$11.50, local buyers are likely to be bidding about \$11.25.

Premiums for November soybean put and call options with various strike prices are presently quoted as follows:

Expected selling price To evaluate the expected minimum (floor) selling price and compare the price risk exposure from the various put options, use the following formula:

$$\text{Minimum (floor) selling price} = \text{put strike} - \text{premium paid} \\ + / - \text{expected basis}$$

Compare two of the options from Table 3.32:

$$\begin{aligned} & \$11.80 \text{ (strike)} - \$0.49 \text{ (premium paid)} - \$0.25 \text{ (expected basis)} \\ & = \$11.06 \text{ (floor selling price)} \end{aligned}$$

$$\begin{aligned} & \$11.50 \text{ (strike)} - \$0.30 \text{ (premium paid)} - \$0.25 \text{ (expected basis)} \\ & = \$10.95 \text{ (floor selling price)} \end{aligned}$$

Table 3.32 Soybeans: buying put options example (\$)

Put option strike price	Put option premium	Call option premium
11.00	0.10	0.61
11.20	0.19	0.51
11.50	0.30	0.31
11.80	0.49	0.21
12.00	0.60	0.12

As you can see, greater protection comes from the put option with a higher strike price and therefore the greatest premium.

Action You decide to use an option to manage your price risk. After considering the various options available, you buy the \$11.50 put (at-the-money) at a premium of 30 cents a bushel.

Scenario 1: Price Decline

If the price declines, assuming the basis remains unchanged at 25 cents under, you will receive the minimum \$10.95 per bushel for your crop. That is the option strike price (\$11.50) minus the expected basis (25 cents) less the premium paid for the option (30 cents).

Assume the November futures price has declined to \$10.50, and local buyers are paying \$10.25 (the future price – the basis of \$0.25 under). With the future price at \$10.50, the \$11.50 put option can be sold for at least its intrinsic value at \$1.00. Deducting the 30 cents you paid for the option gives you a net gain of 70 cents. That is added to the total cash market price of \$10.25, to get you a total net return of \$10.95 per bushel.

Scenario 2: Price Increase

If the price increases, you will allow your put option to expire if there isn't any time value, because the right to sell at \$11.50 when future prices are in excess of \$11.50 has no intrinsic value. Your net return will be whatever amount local buyers are paying for the crop less the premium you initially paid for the option.

Assume the future price when you sell your crop has increased to \$13.00, and the local buyer is paying \$12.75 (the future price – the basis of \$0.25 under). You will either allow the option to expire if there isn't any time value

Table 3.33 Soybean: price increase example

Nov soybean futures price +/- basis = cash price	+/- long put gain/ loss	= actual selling price
\$10.50 – \$0.25 = \$10.25	+0.70	= \$10.95
\$11.00 – \$0.25 = \$10.75	+0.20	= \$10.95
\$11.50 – \$0.25 = \$11.25	–0.30	= \$10.95
\$12.00 – \$0.25 = \$11.75	–0.30	= \$11.45
\$12.50 – \$0.25 = \$12.25	–0.30	= \$11.95

or offset the position if there is time value remaining. If you allow the put option to expire, your net return will be \$12.45 (the local cash market price of \$12.75 – \$0.30, the premium paid).

Regardless of whether the price has decreased or increased, there is an easy way to calculate your net return when you sell your crop:

Future price when *you* sell your crop
 + / – Local basis *at* the time *you* sell
 Premium paid *for* the option
 + option value when option offset (if *any*)
Net selling price

Results Note the different price scenarios for the October time period. Regardless of the price decline in the soybeans, the minimum selling price is \$10.95 per bushel because of the increase in the price of the long put option position. As prices rally, the soybean seller continues to improve on the effective selling price. In other words, the soybean seller has protection and opportunity (Table 3.33).

Strategy 3: Selling Call Options

Increase your selling price in the stable market If you are expecting a relatively stable market, you can increase your selling price by selling (going short) a call option. As a commodity seller, you will increase the effective selling price by the amount of premium collected when you sell call options.

If the future market price increases above the call strike price, you will be able to sell the cash commodity at a better price, but you will begin to lose in

the short call option position. If the market rallies above the call strike price by an amount greater than the premium collected, the losses on the short call will outweigh the increased cash selling price. As a result, this strategy locks in a maximum selling price level.

If the future market declines below the strike price, the only protection you have against the falling prices is the premium collected by selling the call option. Note that by selling options you have a market obligation and therefore you will need to maintain a performance/bond margin account. Additionally, as an option seller, you may be exercised on at any time during the life of the option. As with all the risk management strategies, the effective selling price will be affected by any change in the expected basis.

Action Assume you are a soybean producer who is planning to deliver soybeans in October at the harvest and expect the harvest basis to be 25 cents under the November soybean futures. No soybean futures are currently trading at \$11.50 per bushel and you don't expect very much price movement in the months leading up to the harvest. To enhance your effective selling price, you decide to sell the \$11.80 November soybean call option (out-of-the-money) for a premium of 21 cents per bushel.

Use the following formula to evaluate this strategy, which should also be used to compare this type of strategy when using a different strike price.

Expected Minimum Selling Price

Call option strike price	\$11.80
+ premium received	+\$0.21
+/- expected basis	-\$0.25
Expected Minimum Selling Price	\$11.76

With this strategy, the effective selling price will decrease if the future price falls below the call strike price. Once this happens your price protection is limited to the premium collected and you will receive the lower selling price in the market.

Results Your effective selling price will depend upon the future price and actual basis when you sell your cash commodity. In this example, Table 3.34 lists the effective selling price for a variety of future price scenarios.

Table 3.34 Soybean: selling call options Example (\$)

Nov soybean futures price +/- basis = cash price	+/- short future gain/ loss	= actual selling price
\$10.50 - 0.25 = 10.25	+ 0.21	= 10.46
\$11.00 - 0.25 = 10.75	+ 0.21	= 10.96
\$11.50 - 0.25 = 11.25	+ 0.21	= 11.46
\$12.00 - 0.25 = 11.75	+0.01	= 11.76
\$12.50 - 0.25 = 12.25	-0.49	= 11.76

As the formula indicates, after adjusting for the actual basis, the premium received from the sale of the call increases the effective selling price. But note that there are risks associated with selling options. If the price rallies above the call strike price, there is a possibility that you will be exercised on or assigned the short future position at any time during the life of the call option. As the market rallies, the losses sustained on a short call position will offset the benefit of a higher cash price, thereby establishing a ceiling selling price (\$11.76). In contrast, if the market price declines, your downside price protection is limited to the amount of premium collected.

Strategy 4: Buy a Put and Sell a Call

Establishing a selling price range This is a short hedging strategy with the net effect of creating both a floor price and a ceiling price. Let's assume you are a soybean farmer and you have just planned your crop. The November soybean future contract is trading at \$11.50 per bushel, and you anticipate the local basis to be 25 cents under by harvest. You like the idea of having downside price protection, but if there is a market rally between now and fall, you won't be able to take advantage of it if you are at short futures. Instead you decide to buy a put option. You have downside protection but are locked in if prices rise. The only catch is the option premiums are a little higher than what you'd like to spend. What you can do to offset some of the option cost is to establish a "fence" and a "combination" strategy. With this type of strategy, you buy a put and offset some of the premium cost by selling an out-of-the-money call option.

However, this strategy establishes a selling price range where you can't benefit from a price rally beyond the call strike price (Table 3.35).

Action The first step would be to calculate the "selling price range" under various option scenarios. This is easily done by the following formulas:

Table 3.35 Option premiums: call vs put comparison (\$)

Strike price	Put option premium	Call option premium
11.00	0.10	0.61
11.20	0.19	0.51
11.50	0.30	0.31
11.80	0.49	0.21
12.00	0.60	0.12

$$\text{Floor price level} = \text{put strike price} - \text{put premium} + \text{call premium} + / - \text{expected basis}$$

$$\text{Ceiling price level} = \text{call strike price} - \text{put premium} + \text{call premium} + / - \text{expected basis}$$

After considering various alternatives, you decide to buy an at-the-money \$11.50 put for 30 cents and sell an out-of-the-money \$11.80 call for 21 cents. The strategy can be put on for a net debit of 9 cents per bushel, and a selling price range is well within your projected production cost plus profit margin.

Results As shown in Table 3.36, your net selling price will vary depending on what the November soybean futures price and basis were when you offset your combination put/call (fence) strategy. What is interesting is that with a long put/short call strategy the net selling price will be anywhere from \$11.16 to \$11.46 provided the basis is 25 cents under.

Comparing Commodity Selling Strategies

A commodity seller doesn't have one "perfect" strategy that will fit all market conditions. You need to realize that different economic conditions require different selling strategies. Therefore, a smart seller of commodities should become familiar with all of the available strategies and should learn how to evaluate and compare them, and sometimes realize that a strategy may need to be revised due to changing market conditions.

The commodity selling strategies we have looked at in this chapter are fairly common ones, but by no means are they to be considered an all-inclusive list. Each individual or firm, with their own risk/reward profiles, will have to make the ultimate decision as to what strategy is best for their risk management needs.

Table 3.36 Long \$11.50 put and short \$11.80: scenarios (\$)

Nov soybean futures price – actual basis = cash price	+/- long put price	+/- short call	= net selling price
10.50 – 0.25 = 10.25	+\$0.70	+\$0.21	= \$11.16
11.00 – 0.25 = 10.75	+\$0.20	+\$0.21	= \$11.16
11.00 – 0.25 = 11.25	–\$0.30	+\$0.21	= \$11.16
12.00 – 0.25 = 11.75	–\$0.30	+\$0.01	= \$11.46
12.50 – 0.20 = 12.25	–\$0.30	–\$0.49	= \$11.46

Table 3.37 compares four commodity selling strategies involving futures or options and one strategy not involving price risk management. Each of the strategies has its own strengths and weaknesses, which will be discussed further below.

Short Futures

The short futures position is the most basic price risk management strategy for the commodity seller and allows him or her to “lock in a price level” in advance of the actual sale. This provides the protection against the risk of falling prices but does not allow the improvement in the selling price should the market rally. This position requires the payment of a broker’s commission, as well as the costs associated with maintaining the performance bond/margin account. In Table 3.37, the short future position fares the best when risks occur as the market moves lower.

Long Put Option

The long put option position provides protection against falling commodity prices but also allows the seller to improve on the selling if the market rallies. The long put position establishes a minimum (floor) selling price level. The protection and opportunity of a long put option position comes at a cost—the put option buyer must pay the option premium. In Table 3.37 the long put option provides upside price protection similar to the short futures position with the difference being the cost of protection—the premium. Unlike the short future position, the long put option nets a better selling price when the market rallies. When buying the put option, you must pay a brokerage commission, though you do not have a performance bond/margin account to maintain.

Table 3.37 Comparison of four commodity selling strategies (\$)

Nov soybean futures price	Short futures	Long put	Short call	Long put/ short call	Do nothing
\$10.50	\$11.25	\$10.95	\$10.46	\$11.16	\$10.25
\$11.00	\$11.25	\$10.95	\$10.96	\$11.16	\$10.75
\$11.50	\$11.25	\$10.95	\$11.46	\$11.16	\$11.25
\$12.00	\$11.25	\$11.45	\$11.76	\$11.46	\$11.75
\$12.50	\$11.25	\$11.95	\$11.76	\$11.46	\$12.25

Short Call Option

Although the short call option position is the riskiest of the selling strategies covered in this section, it provides the best selling price in the stable market, as seen in Table 3.37. However, if the future market price increases, the short call option establishes the maximum (ceiling) price level. The worst case scenario for this strategy is if the market declines significantly because the downside protection is limited to the premium collected for selling the call.

Long Put and Short Call Options

By combining the short call position with the long put position, the commodity seller establishes the higher floor level because of the premium received for selling the call. However, the cost of the benefit is that the shorter call position limits the opportunity for higher prices by establishing a ceiling price level. Effectively, the commodity seller using this strategy establishes the selling price range, which is determined by the strike prices and therefore can be adjusted (widened or narrowed) by choosing alternative strike prices. Next to the short future position, this strategy provides the most protection against falling prices, as shown in Table 3.37.

Other Strategies for Selling Commodities

There are many other strategies available to a commodity seller. These strategies may involve futures, options, or cash market positions and each will have its own set of advantages and disadvantages. As stated earlier, a commodity seller should be acquainted with all of the alternatives and understand when

a specific strategy should be employed or revised. Remember, a strategy that worked effectively for one commodity sale may not be the best for your next commodity sale. The first four strategies discussed are usually used in advance of the actual sale of commodities. The next strategy can be used after the sale of commodities.

Strategy 5: Sell Cash Crop and Buy Calls

Benefit from a price increase Another strategy that can be used by the commodity seller is to buy a call option after the sale of the cash commodity. This strategy would enhance your effective selling price if the market rallies after the cash market sale has been completed.

Most farmers will have asked themselves on more than one occasion this question:

“Should I sell my crop now or store and hope prices go up by spring?”

If you sell at harvest, you receive immediate cash for your crop, money that can be used to pay off loans or reduce interest expenses. It also eliminates the physical risk of storing crops, and ensures you won't get into a situation where an increase in price still doesn't cover storage expenses. Therefore, one of the primary comparisons to consider when deciding to store grain or purchase a call option is the cost of storage versus the cost (premium paid) of the call.

Let's assume you are a corn producer and we are now in the month of October and the March future prices are quoted at \$6.30 corn call option is trading at 10 cents per bushel.

Action You sell your corn at harvest, after reviewing the premiums for the various call options. You decide to buy one at-the-money March call option for every 5000 bushels of corn you sell at the elevator.

Results If prices decline, your maximum cost, no matter how steep the future price declines, will be 10 cents per bushel: the premium paid for the call. If the March future price increases any time before expiration, you can sell back the call for its current premium, and your net profit is the difference between the premium you paid for buying the March call and the premium received for selling the March call.

Table 3.38 Corn: long call net gain or loss

March corn future price in February	Long call net gain or loss US\$
\$6.00	0.10 loss
\$6.10	0.10 loss
\$6.20	0.10 loss
\$6.30	0.10 loss
\$6.40	0
\$6.50	0.10 gain
\$6.60	0.20 gain
\$6.70	0.30 gain

Depending upon the March future price, Table 3.38 shows your profit or loss if you had bought a March \$6.30 call at a premium of 10 cents, assuming there is no remaining time value left in the option.

One of the greatest benefits of this strategy is the flexibility it provides to the producer, who doesn't have to feel locked in if a given harvest price is going up and the grain suffers some physical damage. Of course, there is a price for this flexibility—the option premium will vary, depending on what option strike price is bought. Your options are open.

Flexibility and Diversity

The strategies described up to now have hopefully served two purposes: to illustrate the diversity of the ways in which agricultural futures and options can be used and to increase your “comfort level” with the maths of futures and options. By no means, however, have we included—or attempted to include—all possible strategies. Neither have we fully discussed the “ongoing flexibility” enjoyed by buyers and sellers of futures and options. The existence of a continuous two-sided market means that the futures and options initially bought can be quickly sold, and futures and options initially sold can be quickly liquidated by an offsetting purchase. This provides the opportunity to respond rapidly to changing circumstances or objectives.

For example, you pay 1.4 cents per pound for an ATM or At-The-Money soybean oil put option with a strike price of 53 cents and, after several months, the underlying future price declines to 48 cents. The put is now trading for 6 cents. By selling back the option at this price, you have the net return on the option of 4.6 cents (the \$0.06 premium received minus the \$0.14 premium paid). This could be an attractive strategy. If, at 48 cents, you feel the price decline has run its course and prices are now likely to rise above 53 cents, then the put no longer holds any intrinsic value.

Options in Combinations of Other Positions

As you fine-tune your understanding of options, you may well discover potentially worthwhile ways to use puts and calls in combination with hedging or forward contracting, either simultaneously or at different times.

For instance, assume a local elevator offers what you consider an especially attractive price for delivery of your crop at harvest. You sign the forward contract, but you're a little uneasy about the delivery clause. If you are unable to make the complete delivery of the agreed upon amount, the elevator charges a penalty for the undelivered bushels. To protect yourself, you buy enough call options to cover your delivery requirement. Then if you are unable to make the complete delivery on the forward contract due to reduced yields and if the call increased in value, you could offset some or all of your penalty charges.

For example, suppose a producer has entered into a forward contract to deliver 10,000 bushels of corn at \$5.20 in November. December futures are currently trading at \$5.40. He or she simultaneously buys two December \$5.60 corn calls (out-of-the-money) at 10 cents per bushel. A floor price for the crop has been established at \$5.10 (a \$5.20 forward contract minus the \$0.10 premium paid).

Suppose it was a long, dry, hot summer and production fell short of expectation. If these fundamentals caused futures prices to go beyond \$5.70 (the strike price plus the \$0.10 paid for the option), the farmer could sell back the calls at a profit. The producer could then use this money to offset some of the penalty charges he might incur if he doesn't meet the delivery requirement of the forward contract.

4

Trading Versus Investment in Commodities

Commodities can be volatile and they don't always move together. There are five basic groups of commodities: energies, metals, grains, softs, and livestock. Some commodities can be in strong uptrends, while other commodities trend lower. Therefore, investing in one particular commodity could make you a big winner or a big loser. It is better to be safe than sorry and spread your risk. Commodity exchange traded funds (ETFs) are a simple way to diversify your commodity investment and there are some good ones like the iPath Dow Jones AIG Commodity Index Total Return (DJP) and the PowerShares DB Commodity Index Tracking Fund (DBC) which invest in a broad group of commodities that trade more like a stock or mutual fund.

You can still take positions in a few commodities that are in different sectors, but you don't have the staying power with futures contracts due to the risk of unlimited losses. Futures options are also a time sensitive asset, so you could be right on the market direction, but your options could expire before the market moves in your direction.

A commodity trading account is more speculative and only risk capital should be allocated for trading purposes. This is especially true for those who are new to trading commodities. A professional who has traded commodities for more than ten years and consistently makes money may consider commodities trading as an investment. New traders with no experience should not. Managed futures funds are considered to be an investment that is typically well diversified in many futures markets. They have a large pool of money to trade from and that allows them to spread their risk across more than 30 futures markets. Many managed funds utilize a trend following programme,

where they make the bulk of their profits from markets that make big moves. Since they invest in so many markets, it is highly likely they will capitalize on any market that makes a big move.

You are normally much better off by investing in a commodity ETF or a managed futures fund if you are looking for a long-term investment in the commodities markets. They will be more diversified than buying one or two commodities in a trading account. Many investment advisors recommend investing about 10 % of your overall investment portfolio in commodities. Commodity ETFs and managed futures funds are good vehicles to use for diversification.

Commodity ETFs: Investing in Commodities with a Commodity ETF

Investing in a commodity ETF is one of the easiest ways to participate in the commodity markets and also to diversify your investment portfolio. An ETF is very similar to a mutual fund, but it has very little management. It has a set plan for investment in a group of commodities that may be readjusted periodically by the fund manager. It can come in several forms, but most are created to mirror the returns of commodities by investing in the commodity futures markets. They all buy [futures contracts](#) based on the amount of funds they receive from investors. An excellent feature is that they trade just like a stock and you can buy or sell at any time during market hours. More importantly, you cannot lose more than your initial investment with an ETF—many investors have this fear when they consider the futures markets. Some commodity ETFs focus on commodity sectors and only buy futures contracts in that area—oil, agriculture, or gold. As an overall investment to diversify your portfolio, you probably want to focus on a commodity ETF that invests in a more diversified basket of commodities. The following are four of the more popular commodity ETFs:

1. *IShares S&P GSCI Commodity-Indexed Trust*. Ticker Symbol: GSG. This commodity ETF was set up to track the Goldman Sachs Commodity Index. GSG tracks 24 different commodities. It is weighted with approximately 67 % invested in energy, 16 % in agriculture, 7 % in industrial metals, 7 % in livestock, and 3 % in precious metals. The index is production weighted to reflect the relative significance of those commodities to the world economy.

2. *iPath Dow Jones-AIG Commodity Index*. Ticker Symbol: DJP. This commodity ETF was set up to track the Dow Jones AIG Commodity Index. The commodities represented in DJP are rebalanced annually. Each commodity subgroup exposure is capped at around 33 %; however, the weightings fluctuate between rebalancings due to changes in market prices.
3. *Power Shares DB Commodity Index Tracking Fund*. Ticker Symbol: DBC. This commodity ETF operated by INVESCO seeks to reflect the performance of the Deutsche Bank Liquid Commodity index. The index commodities are comprised of light sweet crude oil, heating oil, aluminium, gold, corn, and wheat. DBC has a smaller number of commodities in this ETF than the other two, so take a close look at the six commodities before you invest.
4. *ETF Securities*. This operates a broad range of listed ETFs in a variety of commodities including agricultural markets and energy (www.etfsecurities.com).

Different Ways to Invest in Commodities

Commodities have become a more mainstream investment class in the last decade, primarily due to the fact that commodities have performed much better than other investments. The tailwind behind commodities is driven by a growing population in the emerging countries, hence demand for commodities has soared. Short of a global financial meltdown, demand for commodities is projected to remain strong into the foreseeable future. Commodity futures contracts had been the most common way to invest in commodities, but they aren't exactly considered a mainstream investment by the general public. In reality, most people have virtually no idea how to buy or sell a futures contract. Trading commodity futures contracts is more complicated than stocks and the risks can be much greater. For those reasons it is easy to see why many people have avoided investing in commodities throughout the years.

If you are willing to put in the time, a general understanding of trading commodities can be achieved in a relatively short period of time. However, learning the basics and being a consistently profitable commodities trader are two different things. Fortunately, many new investment vehicles are now available to make investing in commodities much easier and probably less risky.

Commodity ETFs

There are currently more than 100 commodity ETFs. Some are actually exchange traded notes (ETNs), though they are basically the same thing as far as the average investor is concerned. Commodity ETFs are basically investments in commodity futures contracts, but they are unleveraged. This means you cannot lose more than your initial investment, such as when you trade futures contracts. There are so many commodity ETFs that you should be able to find one that meets your objective. Some only invest in one commodity, while others invest in a diversified group of commodities. Commodity ETFs trade very similar to a stock. You can buy and sell them with an account at any brokerage firm, such as Schwab, E-Trade, or Ameritrade. It is easy and cost effective to buy these investments for the long term as part of your overall investment portfolio.

Commodity Stocks

There are obviously many publicly traded companies that are devoted to the production, manufacturing, distribution, or selling of commodities. These stocks obviously do not just reflect the value of the underlying commodity markets they are linked to, their value also depend on the ability of the management of the company and other external factors compared to a pure commodity price investment via commodity futures or a commodity ETF, but their stocks tend to move along with the price of the underlying commodity. An example might be Freeport McMoRan, which is one of the largest copper mining companies, and the price of the stock tends to move closely with the price of copper. Oil companies, gold mining companies, and farming equipment companies are examples of commodity based companies. Sometimes the prices of these stocks move in unison with their related commodity prices, and sometimes they don't. The stock market can be under the influence of many external factors from day to day, but the overall trend should reflect that of the commodity. It is usually better to buy a group of stocks to minimize the risk and get a better representation. Some companies might be in the right industry, but not manage their business well.

It has become much simpler in recent years to invest in commodities. There are more investment opportunities and there will probably be even more in the future if they continue to perform well. An investor can buy commodity ETFs or commodity based stocks or mutual funds and tuck them away in his or her investment portfolio. There is no need for watching quotes on the market all day to monitor these investments. A review once a month or quarter should be adequate.

On the other hand, if you prefer to trade commodity futures contracts, there are many great tools at your disposal. There are some excellent online trading platforms to trade, train, and test your ideas. The amount of trading research available online has grown substantially. This is helping to make commodity traders much more informed. The ease of learning how to trade commodities continues to lower the barriers to entering this arena. It is simply a matter of personal preference, but there are many ways to invest in commodities.

The Influence of Commodity ETFs on the Commodity Markets

Commodity ETFs and ETNs have become a new and easy way for investors to trade commodities and include them as part of their long-term investment portfolio. However, commodity ETFs have somewhat changed the dynamics of the markets, as some believe this wave of new funds into the markets has increased volatility, ultimately leading to exaggerated moves in commodity prices.

How Do Commodity ETFs Work?

Commodity ETFs are funds that invest in commodities. They typically invest in futures contracts on an unleveraged basis. Money flows into and out of the ETFs similar to the way mutual funds invest in stocks. When people invest money into the funds, the fund manager has to buy a designated amount of commodities—or futures contracts. Conversely, when a person redeems funds in the ETF, the fund manager has to sell a proportional amount of futures contracts.

There is an obvious flow of money coming into and out of these funds each day. The net result is what you want to follow. You'll often find that investors tend to put more money into the commodity ETFs that are moving higher. They also have a tendency to avoid the markets that aren't hot.

Overall Commodity Investments

It is important to note that commodity ETFs typically are not leveraged like futures contracts. Some funds are leveraged by a factor of two or three, but not to the degree of futures contracts. In theory, this would drop the likeli-

hood that commodity ETFs lead to over-speculation and exaggerated price swings. After all, it is still a large capital outlay and it takes a great deal of money to move markets. However, there are still some underlying concerns with commodity ETFs that might eventually cause greater problems.

The commodity ETFs that invest in the actual commodity, like SPDR Gold Shares (GLD), are supposed to buy actual gold. The fund is currently worth about \$72 billion. That means the fund should have bought and is currently holding \$72 billion of gold in storage. In reality, that is probably not the case and some experts in the investment world believe this is cause for concern.

It is unlikely that every owner of the SPDR Gold Shares would want to redeem their investment in gold at the same time. What would happen if the fund couldn't make good on this redemption? Certainly they would pay in cash, but that really isn't the point.

The issue of commodity ETFs influencing the markets might become clearer if you realize that investors can continue to buy an asset where there is really no claim on it. What if there was only \$100 billion worth of a commodity in the world, yet a commodity ETF was holding \$200 billion worth of claims on those commodities. Is that how things should work?

A good case could be made that the fund is over-subscribed and that it should only be allowed to accept investment dollars in a commodity that they can actually attain for their investors. That sounds good on the surface, but what happens when you have too many dollars chasing too few goods? Yes, the price rises and sometimes substantially. You would get the same result in price with or without a commodity ETF. An argument could be made that prices would actually be higher if investors could only purchase the readily available supplies.

Commodity ETFs have opened the door to a new crowd of people to invest in commodities, and there is actually more money invested in commodities today. Many investors and money managers won't invest in futures contracts, but now they have a new mechanism to participate in commodities. Commodity ETFs aren't necessarily to blame for the volatility in the markets. They might be the vehicle that brings in extra money, but you still have the same investor mentality. The only difference now is that there are more investors and more money—that is what causes the wider swings in the market.

Commodity ETFs and managed futures are two commodity investments for those who don't want to manage the day-to-day trading activities. Both investments participate in similar markets, but they can be far from the same investments.

Managed Futures

Managed futures are actively traded accounts where a commodity trading advisor (CTA) manages the trading in the futures markets. Each fund is unique in the sense that there is an infinite amount of trading styles and numerous markets in which to trade. As you might guess, the returns vary greatly from one advisor to another. When you invest in managed futures, you are not necessarily dependent on the commodity markets moving higher. CTAs can make money whether the markets are flat or moving up or down. However, the market environment can often play a large part in the performance of a CTA due to its trading methodology.

Commodity ETFs

A commodity ETF invests in a group of commodities or sometimes just a single commodity. Most commodity ETFs invest in futures contracts, but they do not use leverage. This prevents the fund from running into a negative balance situation. More commodity ETFs have been created in recent years that allow commodity investors to find whatever type of fund they are looking for. Some funds invest in a single commodity, whereas others invest in a sector or a diversified group of commodities. Commodity ETFs are dependent on the commodity or on commodities moving higher. For a long term investment, there are benefits and drawbacks to both managed futures and commodity ETFs. It all comes down to individual preferences and investment needs. Here are some major factors to consider when trying to choose between the two.

1. A commodity ETF is much more liquid and trades similar to a stock. It is easy to buy and sell. Some investors even day trade commodity ETFs. Managed futures require paperwork, disclosures, and usually require some type of penalty if funds are withdrawn in the first year.
2. A good case could be made that less research needs to go into investing in a commodity ETF. If you believe a particular commodity is going to move higher, you can simply buy one that agrees with that analysis. You can spend a great deal of time researching past performance of the numerous managed futures programmes. Then you can spend an even longer time reading through the prospectus of each fund to figure out what trading methodology is used.

3. The upside potential can be higher for managed futures. A good CTA can average 20 plus per cent every year. Some CTAs make in excess of 100 % in some years. Some commodity ETFs can also gain that much, but it is unlikely a commodity will average a 20 % move every year. Managed futures tend to average about an 11 % annual return. Commodity prices tend to run in cycles, so there could be many years where returns are negative or flat.
4. Managed futures are often reserved for accredited investors due to the underlying risk of the investment. This forces many small investors out of managed futures. The minimum investment can be as low as \$5000. But it is typically at least \$25,000 and sometimes as high as \$1 million. The minimum investment for a commodity ETF is close to zero. You could buy one share if you wanted, which might be \$20 or somewhere in this ballpark.

No definitive statement can be made as to which is a better investment. In the end it is up to the investment that best suits the investor's needs. I personally like the simplicity of commodity ETFs. You can find such a wide variety of them today to allow you to participate in almost any commodity you want. I also like to buy them for long-term plays. It is much easier to hold a commodity ETF for a long period of time than it is to hold a futures contract.

I believe managed futures can be an excellent investment if you find the right CTA/fund manager. Enough can't be said about letting someone else do all the hard work and you reaping a handsome profit every year.

How to Invest in Commodities with Commodity ETFs

Oil, gold, energy, and the famous orange crops from the movie *Trading Places* are all included in the type of investment known as commodities. Investing in commodities in your portfolio can not only create exposure to different investment products, but it can also help reduce risk, hedge inflation, and diversify your overall investing strategy. However, unless you're planning to open your own microbrewery, loading the back of your truck with bags of wheat, barley, and hops, it is the wrong way to buy commodities. There is an alternative to investing in commodities without becoming the neighbourhood underground tavern.

What Are Commodity ETFs?

Commodity ETFs are a simple way to expose your investment strategy to the price and performance of any commodity, without actually owning the commodity itself. Commodity ETFs consist of either company stocks that are involved with the commodity or they consist of futures and derivative contracts in order to track the price of the underlying commodity, or in some cases indexes.

For example, one of the more popular commodity ETFs is GSG: the iShares S&P GSCI Commodity Indexed Trust ETF. In the case of this particular fund, you do not actually own any commodities: the ETF consists of futures contracts for different commodities like livestock, industrial metals, and agriculture assets.

Are There a Lot of Different Types of Commodity ETFs?

Yes. There are broad-based commodity ETFs that track multiple types of commodities in one fund, like the above-mentioned GSG. There are funds that track one particular commodity like oil ETFs, gold ETFs, and energy ETFs. There are even sub-sector ETFs like solar energy ETFs that just track this particular type of energy.

Why Should I Buy a Commodity ETF?

One advantage of commodity ETFs is the simplicity of the trades. If you want to invest in a commodity, you would have to make individual purchases of commodity futures or invest in commodity-related companies. Then there is the decision of which futures or companies to choose. And even if you decide to invest in a commodity index, there is still the challenge of purchasing all the equities in the index basket in order to target a certain price. Commissions and complexities make it hard to achieve your investing goals.

But in the case of a commodity ETF you make one trade at one price and save on commissions. The commodity ETF is already bundled ahead of time. With one trade, you have instant exposure to the price and performance of a particular commodity.

What Are the Advantages of Commodity ETFs?

When you include commodity ETFs in your portfolio, the best attraction are the benefits they create for investors. Capital gains taxes aren't incurred until

the sale of the ETF, which gives them a tax advantage over other investment products such as mutual funds.

There is also the advantage of having a simpler trade and lower commissions and management fees among the many other benefits of ETFs. Not that there aren't some disadvantages when trading ETFs, but if you understand how they work, commodity ETFs could be a great asset for your portfolio.

Some strategies for trading commodity ETFs are:

- If you are looking to stabilize some gold investments in your portfolio, with one trade you can sell a gold ETF and help reduce your downside gold risk.
- You can also use an energy ETF to hedge to downside the risk for both industry and foreign investments. If you are long on a lot of energy stocks, sell an energy ETF to hedge your downside risk.
- Do you have foreign investments in a country where coal is a major source of income? This would be another opportunity to sell a coal ETF to protect against a downside.
- There is the option of purchasing an inverse commodity ETF which emulates the price of a commodity index in the opposite direction. Inverse ETFs are good if you want to sell a commodity, but can't short ETFs due to margin or account restrictions.
- If you don't want to close your commodity ETF positions, but want some short-term exposure or protection, trading ETF options can be a good strategy.

How Do I Invest in Commodity ETFs?

Before you trade any commodity ETFs, make sure to conduct plenty of research first. Track the performance of the price of different commodities (like coal) and watch how some of the major commodity ETFs move.

The Role of Commodities in Asset Allocation

Investors often look to commodities as a way potentially to gain enhanced portfolio diversification, protection against inflation, and equity-like returns. As such, commodities have gained traction among institutional and retail investors in recent years, either as a separate asset class or as part of a real assets allocation.

While asset class correlations are useful indicators, a more fundamental way to assess the portfolio diversification potential of commodities is to examine how their underlying risk factors differ from those of other asset classes. This is because risk factors, rather than asset classes, are the fundamental building blocks for asset allocation and portfolio diversification.

On the one hand, systematic risks, such as economic and liquidity crises, can affect all risky asset classes including commodities, causing spikes in cross-asset class correlations.

On the other hand, many supply and demand factors that affect commodity prices, such as geopolitical, weather-related, and environmental risks, are fundamentally different from the typical risk factors affecting other asset classes, making commodities a unique asset class.

For instance, when equity returns dropped significantly in the early stages of a recession, commodities generally perform well. These characteristics set commodities apart from other asset classes and suggest that they may improve the diversification of a traditional portfolio over a long-term horizon.

Since commodity prices are among the direct drivers of inflation, commodities are often considered to be one of the key real assets that can protect against rising inflation. While equity and fixed income returns are negatively correlated with inflation, commodity returns have a significant positive correlation with both expected and unexpected inflation.

Commodities tend to thrive in rising inflation environments while equities and fixed income assets generally generate poor returns, bringing both inflation protection and diversification benefits.

5

Hedge Funds and Alternative Investments in Commodities

Commodities and Their Attraction as Alternative Investments

Commodities earn equity-like yields, even though with a relatively high volatility. Through their negative correlation to equities and their low correlation to bonds, they act as a kind of insurance cover against political and also economic shocks, and especially against crises jeopardizing the supply of petroleum which is still the lifeblood of most industrialized economies. Used in a diversified portfolio, commodities significantly reduce the risk of a setback for the overall portfolio.

Commodities are important for the survival of our society. In addition, they are scarcity goods, either because they have a use-by period or because they are not infinitely available. In the case of non-renewable commodities, there is a danger of reserves being exhausted; in agriculture, the yield is dependent on the available areas under cultivation, on the climate, and on the weather. The degree of scarcity determines the price.

Petroleum is one of the most important components of common commodity indices. There are many indications that the culmination point of production has already been passed. Petroleum thus plays an ever more important role from an economic point of view and also in terms of world politics. Its prices have a major influence on the economy and on prosperity, thus also affecting the securities markets.

What Is a Hedge Fund?

A hedge fund is an alternative investment vehicle available only to sophisticated investors, such as institutions and individuals with significant assets, and there are many which provide access to strategies in the commodity space.

The investment fund vehicle or structure going by the name of “hedge fund” is often perceived as a modern day financial market development. However, nothing could be further from the truth as, in 1949, Alfred Winslow Jones started an investment partnership that is regarded as the first hedge fund. Remarkably many of the ideas that he introduced over 50 years ago remain fundamental to today’s hedge fund industry.

Jones structured his fund to be exempt from the Security Exchange Commission (SEC) regulations described in the Investment Company Act of 1940. This enabled Jones’s fund to use a wider variety of investment techniques, including short selling, leverage, and concentration (rather than diversification) of his portfolio. Jones committed his own money in the partnership and based his remuneration as a performance incentive fee, 20 % of profits. Both practices encourage interest alignment between manager and outside investor and continue to be used today by most hedge funds. Jones pioneered combining shorting (going short on an asset and leverage, techniques that generally increase risk) and used it to hedge against market movements and reduce his risk exposure. All of these are common features of modern hedge funds where portfolio managers typically take short positions in markets—betting on falling prices—as well as long positions that benefit from rising markets.

The idea is to hedge against market declines (hence the name) and produce consistently positive returns, irrespective of the direction of the overall market. That “absolute” return goal contrasts with traditional mutual funds, which declare victory if they simply outperform benchmarks such as the Standard & Poor’s 500 Index.

Structurally, a hedge fund has some similarities to a mutual fund. For example, just like a mutual fund, a hedge fund is a pooled investment vehicle that makes investments in equities, bonds, options, and a variety of other securities including commodity derivatives. It can also be run by a separate manager, much like a sub-advisor runs a mutual fund that is distributed by a large mutual fund company. That, however, is basically where the similarities end. The range of investment strategies available to hedge funds and the types of positions they can take are quite broad and, in many cases, very complex. The main attraction of hedge funds is that they can contribute returns that

are not closely tied to any particular commodity market, global stock, or bond market, providing diversity to an investor's portfolio.

While access to hedge funds is getting easier for everyday investors, the biggest and best managers are still primarily reserved for those with at least \$1 million to commit. Those with less have a smaller selection that includes so-called "funds of hedge funds", which allocate to a range of underlying managers, and mutual funds employing hedging tactics. For small investors (under \$50,000 dollars per investment) the usual access route to commodity hedge-fund-like returns are via exchange traded funds (ETFs), for example those provided by the company ETF Securities and their range of products where the shares move up and down with an underlying commodity market or selected basket of commodities. These typically though do not offer long/short benefits as profits can only be made in a rising commodity market, that is they are a long only strategy.

Development of Hedge Funds

The explosive growth in hedge funds led to a market for professionally managed portfolios of hedge funds, commonly called "funds of funds", which provide benefits that are similar to hedge funds, but with lower minimum investment levels, greater diversification, and an additional layer of professional management. Some funds of funds are publicly listed on the stock exchanges in London, Dublin, and Luxembourg. The oldest listed fund of funds on the London Stock Exchange, Alternative Investment Strategies Ltd, dates back to 1996.

In the context of funds of funds, diversification usually means investing across hedge funds using several different strategies, but it may also mean investing across several funds using the same basic strategy. Funds of funds may offer access to hedge funds that are closed to new investors. Given the secrecy in hedge funds, a professional funds of funds manager may have greater expertise to conduct the necessary due diligence. Of course, professional management of a fund of hedge funds entails an additional layer of fees.

Hedge Fund Regulation

Hedge funds are often not directly regulated by a financial regulator, although the investment advisors or management company to the fund are usually professionally qualified and regulated. Due to the Dodd–Frank Act in the

USA and similar legislation around the world, including Mifid (Markets in Financial Instruments Directive) in Europe, (all post-2008 market crash legislation) many of the commodity derivative trades by hedge funds are now recorded in trade databases which the financial market regulators can access for regulatory compliance purposes.

Hedge funds themselves are primarily structured to avoid direct regulation on how they invest and to have independence and no regulatory control on their strategies. Sometimes it is to allow them to keep their strategies secret from the public domain.

In fact there is no regulatory agency that maintains official hedge fund data. Some databases combine hedge funds with commodity trading advisers who are usually individual traders managing people's trading accounts (commodity trading advisor, CTAs); some separate them into two categories. Also, different hedge funds define leverage inconsistently, which affects the determination of assets under management (AUM), so aggregate hedge fund data are best viewed as estimates.

There are many firms providing hedge fund databased information and a history of returns, but two very popular reference databases are the Barclay Hedge Fund database (www.barclayhedge.com) and the Lipper fund database (www.lipperweb.com).

One benefit for investors is that, as a result of their strategies being relatively unregulated, hedge funds can invest in a wider range of strategies than say mutual funds whose activities are usually restricted in terms of how and what they invest in.

While many hedge funds do invest in traditional securities and derivatives, such as stocks, bonds, commodities, and real estate, they are best known for using more sophisticated investments and techniques.

Hedge funds typically use long/short strategies, which invest in some balance of long positions (which means buying positions) and short positions (which means selling positions first, then buying them back later when their price has fallen). This allows hedge funds to profit on falling markets as well as rising markets.

Additionally, many hedge funds invest in “derivatives”, which are contracts to buy or sell a commodity at a specified price. You may have heard of futures, swaps, and options; these are considered derivatives.

Many hedge funds also use an investment technique called leverage, which is essentially investing with borrowed money—a strategy that could significantly increase return potential, but also creates a greater risk of loss. In fact, the name “hedge fund” is derived from the fact that hedge funds often seek to increase gains, and offset losses, by hedging their investments using a variety of sophisticated methods, including leverage.

Hedge funds are typically not as liquid as mutual funds, meaning it can be more difficult to sell your shares as they are usually not publicly listed shares on a stock market, but shares that are bought and sold directly via their fund administrator/custodian.

Mutual funds have a per-share price (called a net asset value or NAV) that is calculated each day, so you could sell your shares at any time. Most hedge funds, in contrast, seek to generate returns over a specific period of time called a “lockup period”, during which investors cannot sell their shares. (Private equity funds, which are similar to hedge funds, are even more illiquid; they tend to invest in start-up companies, so investors can be locked in for years.) Many of the commodity hedge funds will have their fund administrator publish a monthly NAV for shareholders so they can track their performance.

Fees and Management Incentive Fees

Hedge fund managers are typically compensated differently from mutual fund managers, who are paid fees regardless of their fund’s performance. Hedge fund managers, in contrast, receive the majority of their fees by performing well via a percentage of the returns they earn for investors. In the commodity industry this is typically in the region of 20–25 % of profits made for investors. Alongside this they will charge a “management fee”, typically in the range of 1–2 % of the net asset value of the fund. That is appealing to investors who are frustrated when they have to pay fees to a poorly performing mutual fund manager.

To ensure profits are determined fairly, high water marks and hurdle rates are sometimes included in the calculation of incentive fees. A high water mark is an absolute minimum level of performance over the life of an investment that must be reached before incentive fees are paid. A high water mark ensures that a fund manager does not receive incentive fees for gains that merely recover losses in previous time periods. A hurdle rate is another minimum level of performance (typically the return of a risk-free investment, such as a short-term government bond) that must be achieved before profits are determined. Unlike a high water mark, a hurdle rate is only for a single time period. Data available from fund databases have shown that funds with high water marks have significantly better performance and are widespread (80 % of funds), whereas hurdle rates are only used by 16 % of funds and have a statistically insignificant effect on performance.

Term Structure

The terms offered by a hedge fund are so unique that each fund can be completely different from another, but they usually are based on the following factors.

Subscriptions and Redemptions

Hedge funds do not have daily liquidity like mutual funds do. Some can have subscriptions and redemptions monthly, while others accept them only quarterly. The terms of each hedge fund should be consistent with the underlying strategy being used by the manager. The more liquid the underlying investments, the more frequent the subscription/redemption terms should be. Each fund also specifies the number of days required for redemption, ranging from 10 to 180, and this too should be consistent with the underlying strategy. Requiring redemption notices allows the hedge fund manager to raise capital efficiently to cover cash needs.

Lock-Ups

Some funds require up to a two-year “lock-up” commitment, but the most common lock-up is limited to one year. In some cases, it could be a hard lock, preventing the investor from withdrawing funds for the full time period, while in other cases an investor can withdraw funds before the expiration of the lock-up period provided he or she pays a penalty. This second form of lock-up is called a soft lock and the penalty can range from 2 % to 10 % in some extreme cases.

Alternative Investments: Hedge Fund Strategy Classifications

Long/short This is the traditional type of hedge fund. Its strategy involves buying certain stocks long and selling others short. There usually isn't a restriction on the country in which the stocks must be traded. Long/short funds use leverage and adjust “net” long or short positions based on economic forecasting. Note that short positions are intrinsic to hedging and are critical in the

original definition of hedge funds, that is being able to protect or profit from market prices going down.

Market-neutral funds/relative value Relative value funds use market-neutral strategies that take advantage of perceived mispricing between related financial instruments. A hedge fund strategy that seeks to exploit differences in commodity prices by being long and short in similar commodities which may be just traded in a different location or different currencies or have different levels of liquidity which create some imperfections in pricing. Long positions are viewed as undervalued while short are overvalued. These funds are sometimes also referred to as arbitrage funds.

Tactical trading/global macro-fund This is a hedge fund strategy that bases its holdings, such as long and short positions in futures markets, primarily on overall economic and political views of various countries (macroeconomic principles). For example, if a manager believes that the USA is headed into recession, he or she might short futures contracts on major commodity indexes or the US dollar.

Futures fund (managed future fund) This is a commodity pool that includes CTAs. These funds take direction bets in the positions they hold in a single asset class such as currencies and interest rates or commodities.

Event driven A hedge fund strategy in which the manager takes significant positions in a certain number of commodities in “special situations”.

Organizational Structure

The typical hedge fund structure is a two-tiered organization: the investment management firm and the investment fund structure which investors buy shares in.

Another popular route is where a fund platform is utilized. In this scenario, shown in Fig. 5.1, the investment managers are the financial advisor to the fund; the fund is a segregated portfolio within an existing fund. This offers great cost savings as audit and legal setup costs and other infrastructure costs



Fig. 5.1 Apex Global Platform (Source: www.apexfundservices.com reproduced with the kind permission of Apex Fund Services)

are spread amongst many hundreds of funds and so start-up costs and overheads for emerging new managers and for investors can be greatly reduced. Since it is generally understood in the industry that the vast majority of hedge funds particular to the commodity space have less than \$50–100 million of AUM, keeping costs down is a key priority for managers as well as investors (Fig. 5.1).

In addition to the general structure, the next choice hedge funds make is the jurisdiction and regulatory umbrella of the fund and then their investment manager company.

The choice largely depends on their target investor group. For example, a European pension scheme investing in a hedge fund may require it to have a European hedge fund legal structure regulated in Europe, whereas a high net worth individual may be more focussed on lower costs and a strong fund administrator and auditors, and be very comfortable with the popular Cayman Islands hedge fund structure.

Hedge funds are usually more secretive than other pooled investment vehicles, such as mutual funds. A hedge fund manager may want to acquire her positions quietly, so as not to tip off other investors of her intentions. Or a fund manager may use proprietary trading models without wanting to reveal clues to her systematic approach. With so much flexibility and privacy conferred to managers, investors must heavily rely upon managers' judgements in investment selection, asset allocation, and risk management.

There is a fundamental conflict between the needs of hedge funds and the needs of regulators overseeing consumer investment products. Hedge funds need flexibility, secrecy, and strong performance incentives. Regulators of consumer financial products need to ensure reliability, full disclosure, and managerial conservatism. Removing hedge funds from the set of regulated

consumer investment products, and then barring or restricting general consumer access to them, reconciles these conflicting objectives.

The USA has been the centre of hedge fund activity, but about two-thirds of all funds are domiciled outside the country. Often these “offshore” hedge funds are established in tax-sheltering locales, such as the Cayman Islands, the British Virgin Islands, Bermuda, the Bahamas, Luxembourg, and Ireland, specifically to minimize taxes for non-US investors. US hedge funds often set up a complementary offshore fund to attract additional capital without exceeding SEC limits on US investors.

In Switzerland, hedge funds need to be authorized by the Federal Banking Commission, but once authorized, they have few restrictions. Swiss hedge funds may be advertised and sold to investors without minimum wealth thresholds. In Ireland and Luxembourg, hedge funds and offshore investment funds are even allowed listings on the stock exchange.

Hedge Fund Performance

If you read the description of most hedge fund investment objectives, there is usually some mention of absolute returns. It is this goal that makes hedge funds so attractive, particularly when markets are down. Unlike mutual equity funds, which constantly measure themselves against their appropriate benchmarks and comment on their performance versus their benchmarks, hedge funds’ key promise to investors is to provide absolute returns (alpha) regardless of market conditions.

Absolute Returns or Alpha

A hedge fund must be evaluated based on absolute returns, which also need to be consistent with the fund’s strategy. There are funds that employ strategies that generate very consistent returns over time with limited volatility. An example of this type is an asset-backed lending fund that makes loans and collects payments that are predictable and consistent over time. These funds can generate anywhere from 8 % to 12 % per year and are often used as a substitute for fixed income when the latter is not attractive.

There are other fund strategies that should have similar returns, and there are also strategies that should generate higher returns, albeit with much higher

volatility. In either case, a hedge fund that describes its strategy as pursuing absolute returns should always have positive returns over 12-month periods, for example. Most hedge funds fall short of these expectations, but in a perfect world, absolute returns should be positive and consistent.

The Sharpe Ratio

One metric that is widely used in the hedge fund world is the Sharpe Ratio, which measures the amount of return adjusted for each level of risk taken. It is calculated by subtracting the risk-free rate from the annualized returns and dividing the result by the standard deviation of the returns. This metric can be applied across hedge funds with different levels of returns and volatility to determine whether the fund is generating any alpha (excess return) by taking on additional risk. A good Sharpe Ratio will vary by strategy and anything above 1 tends to be an attractive return.

It should be noted however that the Sharpe Ratio may not give a useful indication when applied to commodity funds investing and trading in commodity derivatives. To expand on this comment, the variance of a portfolio return is the expected squared deviation of the return from its mean. If the portfolio return has a normal distribution, the variance of the return completely describes the riskiness of the return. Although normality is not necessary for application of the variance-based approach, the approach becomes less useful if returns differ very sharply from a normal distribution. Portfolios that include derivatives are notable for their lack of normality.

As the majority of hedge fund portfolios will include derivatives, it is clear that some other approach instead of (or in addition to) the variance-based approach like the Sharpe Ratio, which is very popular in equity mutual funds, is needed to measure the risk of hedge funds.

Standard Deviation of Returns

Another common risk measure used in both hedge fund and mutual fund evaluations is standard deviation, which in this case is the level of volatility of returns measured in percentage terms, and usually provided on an annual basis. Standard deviation gives a good indication of the variability of annual returns and makes it easy to compare to other funds when combined with

annual return data. For example, when comparing two funds with identical annualized returns, the fund with a lower standard deviation would normally be more attractive.

Unfortunately, and particularly when related to hedge funds using derivatives in their portfolios, like the Sharpe Ratio, standard deviation does not capture the total risk picture of returns. This is because most hedge funds using derivatives would not have normally distributed returns and standard deviation assumes a bell-shaped distribution of returns. To get a more accurate idea of the risk level a fund has taken to make the returns it has for its investors, a new measure being adopted by hedge funds is a value at risk (VaR) adjusted return.

Value at Risk Versus Returns (VaR Adjust Returns Ratio)

An increasingly popular method of gauging commodity hedge fund risk reward ratios in their returns is a VaR versus returns ratio. The lower the average VaR or capital at risk to obtain the returns generated, the better the risk reward ratio for investors.

In economics and finance, VaR is the maximum loss not exceeded with a given probability defined as the confidence level, over a given period of time. It is commonly used by security houses or investment banks to measure the market risk of their asset portfolios and now used by hedge funds to give investors a perspective on the level of risk taken to achieve the returns they did.

The good thing about VaR is despite it is more difficult to estimate than variance, it has a strength in that it works for a portfolio including derivatives and other non-linear patterns in returns.

Benchmarks

Another approach to comparing commodity hedge funds that is still very common, and one that is prevalent in the mutual fund world, is to analyse relative returns against a benchmark. For example, a large-cap stock market manager would be compared to the S&P 500 Index, or the FTSE 100, and his or her performance would be evaluated based on the fund's returns and

standard deviation relative to the index. For hedge funds, the relative performance analysis is more challenging but not impossible. For commodity trading firms a common benchmark is the Thomson Reuters CRB Commodities Index.

The key way many investors will observe the positive returns of a commodity hedge fund or strategy versus the market will be to ask a question such as in the following example. This is an oil strategy; so if I had just bought oil, for the same period the hedge fund strategy is reporting for, what would have been my return? If the hedge fund strategy is long/short then it should outperform someone just buying and holding that commodity for the same period of time.

Evaluating hedge fund performance differs significantly from the analysis used in other investments because of their risk/return characteristics and unique strategies. Robust analytical software will provide not only the metrics mentioned above, but also a variety of other metrics that can add insight into the performance of a particular fund. The list of metrics can be endless and every analyst tends to gravitate towards a group of select favourites that provide enough information to determine whether due diligence should continue.

The further along a fund gets in the due diligence process, the more likely other metrics will be considered and analysed. Keep in mind that one can analyse any fund to the point of finding something wrong with it, but that this is not the goal. Instead, investors should strive to understand metrics well enough to evaluate a portfolio properly. There is not return without some form of risk. The key thing is to understand and appreciate the risk and, if acceptable, make your investment.

Another key difference noted when comparing the analysis of a mutual fund or in fact performance of an individual equity stock versus a commodity market hedge fund, is that stock market analysis may be useful over 10 , 20 , or 30 years. However, analysing the coffee market over 20 years may not prove very useful as it and other commodity markets will be affected by changing consumer tastes, growing regions, weather changes, pests, and other factors including trade barriers and import tariff changes. Near term comparison analysis of a commodity hedge fund performance, for example up to three years historical analysis, versus a commodity or commodity benchmark is going to mean much more than further analysis as physical commodity supply and demand characteristics, and therefore the performance and behaviour of the underlying market, will have more likely changed.

Ranking of Commodity Hedge Funds Versus Other Types of Asset Classes

According to Prequin, a hedge fund analysis group (www.prequin.com), in 2014 a large commodity hedge fund “Merchant Commodity Fund” based in Singapore and with approximately \$1.2 billion dollars under management was sixth amongst thousands of hedge funds in its ranking of its top returns of 59.29 % of annual returns (see Fig. 5.2).

Fund	Manager	Core Strategy	Net Returns in 2014 (%)
Parag Me India Opportunity Fund (Cumans) - A Shares	Arstone Capital	Long Bias, Value Oriented	225.21
verBio Select Fund LLC	verBio	Long/Short Equity, Sector Focused	73.54
Clash Technology Fund	Clash Ventures	Long/Short Equity	57.96
Melchior Capital - Ordinary	Melchior Capital Investments	Long/Short Equity	55.51
Acharya India Long Term Fund	Acharya Investment Management	Long/Short Equity	50.50
Merchant Commodity Fund	IGMA Asset Management	Commodities	59.29
Radant Focus Fund	Radant Capital	Long/Short Equity, Value Oriented	57.45
Rheeman Healthcare Equity Long Short Fund - 60% 10%	Rheeman & Partners Asset Management	Long/Short Equity	50.87
Capra Capital Fund	Capra Capital	Value Oriented	50.87
JC Clark Aday Fund - Class D Master Series	JC Clark	Long/Short Equity	48.85
Pillar Star Fund (L1)	Pillar Star Management	Relative Value Arbitrage	39.55
Arviva Alpha India L10	Arviva Fund Management	Long Bias	39.09
Clawson & Partners	Lewiston Capital Management	Event Driven, Value Oriented	38.00
AFC Asia Frontier Fund - CHF-A	Asia Frontier Capital	Long Bias	37.53
Chook II Fund	Alex Capital Management	Managed Futures/CTA, Multi-Strategy	37.19
Om China Century Fund	LYON Capital	Long/Short Equity	35.97
Vendor Select Fund	Vendor Capital Management	Long/Short Equity	34.47
CITIC China Alpha II Fund L10	CITIC Securities International Fund Management	Long/Short Equity	35.88
Okonus Opportunistic Value Fund - Class C	Okonus Fund Management	Long Bias	34.50
Overseas India Equity Fund - Class G	Overseas Capital	Long Bias	34.42

Fig. 5.2 Ranking of commodity hedge funds versus other types of asset classes (Source: Reproduced with the kind permission of Prequin Ltd)

6

Understanding the Fundamentals of the Commodity Markets

Commodities are generally divided into four categories: soft commodities, mainly agricultural, such as wheat, sugar, palm oil, and coffee; industrials or base metals, including copper, nickel, aluminium, zinc; precious metals such as gold, silver, platinum, and palladium; and energy, primarily oil, coal, and gas.

The way prices are formed in physical commodity markets and their related derivative futures contracts is the result of complex interactions between very particular factors, such as product characteristics (e.g., quality, storability, or availability of substitutes) and supply and demand factors (e.g., capital intensity, industry concentration, production concentration, technological developments), and external business and physical environmental factors, such as access to and cost of finance, public subsidies and interventions, and the weather.

Price formation relies on the efficient functioning of the market organization for physical commodities and linked futures contracts. International market liberalization, the development of futures market infrastructure, and the expansion of international trade have significantly altered the organization of commodity markets over the last decade.

In general, supply factors (such as capital intensity) are more important drivers of price formation for energy commodities and industrial metals, while agricultural and soft commodities markets are more influenced by demand factors such as income growth and factors that can cause supply shocks, for example weather events or government policies.

The key driver, according to the IMF, and backed up by investment managers, is the expansion of demand in emerging markets. The continuing growth in the more dynamic emerging market economies—such as the BRIC economies of Brazil, Russia, India, and China—is increasing demand for commodities as these countries undertake large infrastructure projects, as urbanization takes place, and as their populations aspire to higher standards of living.

Alongside this major influence, there are the effects of quantitative easing as well as the restocking of resource inventories as the global economy begins to show stronger signs of recovery. Add to that list restrictions in the supply of many commodities and you have a strong, if simplistic, argument that commodities prices will rise in the long term.

A Closer Look at the Fundamentals

Energy resources and industrial metals (e.g., copper, iron ore, aluminium) rely on a more complex market organization with easier access to finance due to their ability to hold value, for example carry trades where forward prices in the futures markets are higher than today's spot price, facilitating the physical purchase and storage of a commodity today and a simultaneous forward sale contract locking in a higher value that covers the cost of financing and storage costs, insurance, and leaving with a net profit.

Volatile spot price levels across several commodities and a growing correlation between returns on financial and non-financial assets have raised concerns over the role of factors that are unrelated to market fundamentals in price formation. Factors, such as greater interaction with the financial system (post-2008 crisis) and supply constraints in the freight markets, have become increasingly important.

The growth of emerging economies in particular growth from Chinese industrial consumption and population growth has affected demand for industrial commodities such as oil, gas, and agricultural markets, including food crops (e.g., corn imports to China) and textile related crops (e.g., cotton imports).

Technological changes and politically enforced mandates for biofuels to tackle greenhouse gas emissions from transportation and the power industry have promoted the widespread use of some commodities for alternative applications, such as corn, soybean oil and sugar for fuels, or soybean oil for pharmaceutical products. New fundamental factors may therefore affect the use of a commodity and its price formation, which may ultimately increase the correlation with other factors that are not directly linked to the underlying

physical commodity. A strong example of this is the influence of crude and gasoline oil prices in the price formation of corn, and soya for example following President Obama's introducing a much higher percentage of ethanol mix in gasoline in the USA.

It is not just in the USA where fundamental driver changes have occurred in recent years, but global agricultural markets have changed dramatically too. The combination of increased industrial demand for grain along with growing global food demand has led to higher crop and livestock prices, and increased demand and prices for agricultural inputs. Beginning in late 2006, rapid growth in US biofuel production resulted in sharply higher and more volatile crop prices. This new demand for corn, combined with a backdrop of accelerating global food demand, resulted in dramatic price increases from the 2005 to the 2011 crop year, including the major crops of corn (up 210 %) and grain sorghum (up 228 %), wheat (up 111 %), soybeans (up 119 %), barley (up 111 %), oats (up 114 %), rice (up 84 %), cotton (up 91 %), and alfalfa hay (up 88 %). Many crop producers have experienced profitability despite the fact that input prices have also jumped sharply with big increases in fuel, fertilizer, and other input prices.

Livestock industries have endured enormous shocks to adjust to feed prices that have double to triple historical levels. These shocks spawned adjustments in the beef, pork, dairy, and poultry industries that continue to this day and have precipitated long-term structural change in the price of beef and perhaps other livestock sectors that will take many years to complete.

The increased competition for crop production not only results in reallocation of land among crops (corn acreage has increased over 20 % since 2006, while most other crops are down in acreage). Typically three crops that were closely linked before were corn, soya, and cotton now that the rotation of these crops and the way farmers choose them are changing.

Several factors from the previous discussion are important to the question of agricultural producer transition. First, the new higher plateau for agricultural product values appears to be permanent. While drought and a number of other short-term factors are part of the current agricultural market situation, the increased food and industrial demands for agricultural products are fundamental and permanent.

US agriculture evolved over the last 60 years in an environment of cheap energy that deeply affected the structure and function of agriculture, which in the future will have to adjust to operate in a significantly higher energy cost climate. In the past sudden increases in diesel prices impacted on the costings for agriculture globally. So this is always something to watch closely.

Biofuel demand has been the catalyst of change in the past few years, in particular for corn in the USA and for sugar in Brazil. Both of these feedstocks go into ethanol production which is blended with gasoline to make biofuel mixes. In the USA this can be up to 25 % in some places; however, in Europe this is typically still only a 5 % ethanol mix.

Politics will continue to be part of the agricultural market landscape. It is likely that growing global food demand will be more important in the long run. Emerging economic power and population growth in several developing countries, but especially China and India, will likely ensure that agricultural product values will remain elevated.

In recent years India has become a swing producer/consumer for international raw sugar markets, affecting greatly the market price in recent years. Subject to when the monsoon rains arrive in India and how intense they are usually greatly impacts on the yield of the sugar crop, and this has driven the country to be either a major importer due to a bad harvest or a large net exporter pushing international raw sugar prices down.

Increased volatility of agricultural products and input prices and the associated risk is the second major factor that makes future agricultural markets fundamentally different from the past. Natural resource demands from emerging economies not only keep agricultural product values high but also continue to push up input values (the products required for the farming industry) as long as global incomes are increasing. Energy, fertilizer, feed, and other agricultural inputs will be increasingly demanded in global markets. While expanding markets and high product values represent new opportunities, the associated risk implies new challenges for agricultural producers and the need for new approaches to business. Agricultural markets are increasingly subject to more shocks from external macroeconomic and global market factors compared to the past when internal market fundamentals were the biggest drivers of product prices.

Commodities are a volatile asset class and the growing interconnection between financial and non-financial assets, and between regional physical markets, has amplified the reaction to market shocks, such as the recent financial crisis and the global economic downturn, and thus created volatility peaks in the short term. As a consequence, short-term volatility remains above pre-2008 levels.

The expansion of international trade across all commodity markets, supported by regional trade liberalization and broader World Trade Organization commitments, has coincided with the economic expansion of emerging markets, such as China and Brazil, and their growing participation in these markets. Brazil is the world's largest exporter of sugar and ethanol (having

approximately 80 % of the world's international trade) and is a major exporter of iron ore.

The growth of domestic demand in the emerging economies has also been an important driver of growth for commodity markets. Cross-border trade liberalization has increased the effect of competition on commodities production costs and so made “traditional” subsidy programmes ineffective and/or too costly. New developments on the supply side, such as new unconventional sources of natural gas or new products from corn processing (e.g., biofuels), have also been stimulating cross-border trade in new markets.

Seaborne freight markets have become the backbone of international trade, but they can be subject to abrupt volatile trends when supply capacity has to adjust. In 2008, freight costs for iron ore shipped from Brazil went from roughly 200 % to less than 20 % of the commodity price in under six months. The Baltic Dry Freight Index shown in Fig. 6.1 is an index now traded by commodity investors as it is a good proxy for economic recovery. More trade, more need for freight, equals higher global freight prices.

Freight input costs to all commodities were not transparent before, but now formalized traded markets in freight routes for liquid commodities and dry bulk commodities like metals and agricultural markets are available. A good source of information is Freight Investor Services, one of the original brokers in the forward freight market (<http://freightinvestorservices.com>).

Volatile freight plus cross-border competition as mentioned earlier in this chapter has come with the price of higher short-term volatility; but where there is volatility there is also opportunity for investors and traders.

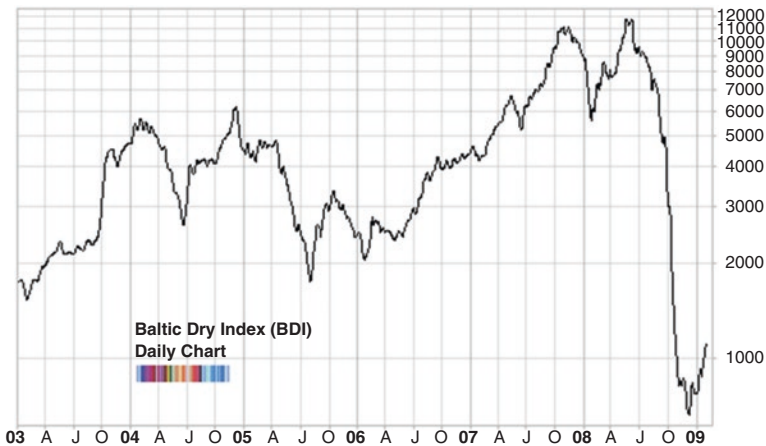


Fig. 6.1 The Baltic Dry Freight Index (Source: Navitas Resources Pte Ltd – www.navitasresources.com)

Agricultural Markets

Since 2006, the world has been eating more food than farmers grow. Projections by the United Nations show that cereal output will need to rise by almost 1 billion tons (43 %) and meat output by over 200 million tons (74 %) to meet the growing population and the changing diets of the world. A core theme behind many investors' interest in agricultural commodities is the stress that land resources and water resources face in meeting this anticipated demand.

Who? Where? What?

There are numerous ways of assessing agricultural output, including sheer tonnage and the dollar volume of the commodities produced. It's important to look at both, as it is often the case that commodities critical to the food supply of less-developed countries don't show up as high dollar-value crops.

Of the major cereal and vegetable crops, the USA, China, India, and Russia frequently appear as leaders. It probably won't surprise you that China is the leading worldwide producer of rice, but it's also the leading producer of wheat and the number two producer of corn. In terms of total production, the USA is third in wheat and first in corn and soybeans (Table 6.1).

The other key agricultural market traded internationally is raw sugar. Brazil is the dominant exporter on a consistent basis; and India, depending on the monsoon rains, is a significant exporter or net importer.

Approximately 80 % of sugar is produced from sugar cane, which is largely grown in tropical countries. The remaining 20 % is produced from sugar beet, which is grown mostly in the temperate zones of the northern hemisphere. Seventy countries produce sugar from sugar cane, 40 from sugar beet, and ten from both (Fig. 6.2). The ten largest sugar producing nations represent roughly 75 % of world production, Brazil alone accounting for almost 25 %, and its share is increasing, although the country's output has witnessed something of a setback since the 2008–2009 crisis (Table 6.2).

The composition of meals changes gradually as lifestyles change. We have seen this most recently in Asia, with more dairy being incorporated into the diet.

What agriculture produces is driven by consumer demand, and changes in consumer preferences have an influence on the water needed for food production. Cereals are by far the most important source of total food consumption.

Table 6.1 Most internationally traded agricultural commodities

Cereal	First	Second	Third	Fourth	Fifth
Barley	 Russia	 Germany	 France	 Canada	 Turkey
Maize (corn)	 United States	 China	 Brazil	 Argentina	 Ukraine
Millet	 India	 Nigeria	 Niger	 China	 Mali
Rice, paddy	 China	 India	 Indonesia	 Bangladesh	 Vietnam
Rye	 Germany	 Russia	 Poland	 China	 Belarus
Sorghum	 United States	 Nigeria	 India	 Sudan (former)	 Ethiopia
Wheat	 China	 India	 United States	 Russia	 France
Cassava	 Nigeria	 Thailand	 Indonesia	 Brazil	 Democratic Republic of the Congo
Soybean	 United States	 Brazil	 Argentina	 China	 India

Source: Research by Navitas Resources Pte Ltd.

In developing countries the consumption of cereals 30 years ago represented 61 % of total calories. This has decreased to 56 % and reflects diet diversification, proving that more countries have achieved higher levels of nutrition. It is expected that cereals will continue to supply more than 50 % of the food consumed in the foreseeable future. Crops grown in the USA are critical for its own food supply and that around the world. US exports supply more than 30 % of all wheat, corn, and rice on the global market. A large proportion of cereals is produced for animal feed. Food production from the livestock sector includes meat (beef, pork, poultry), dairy, and eggs.

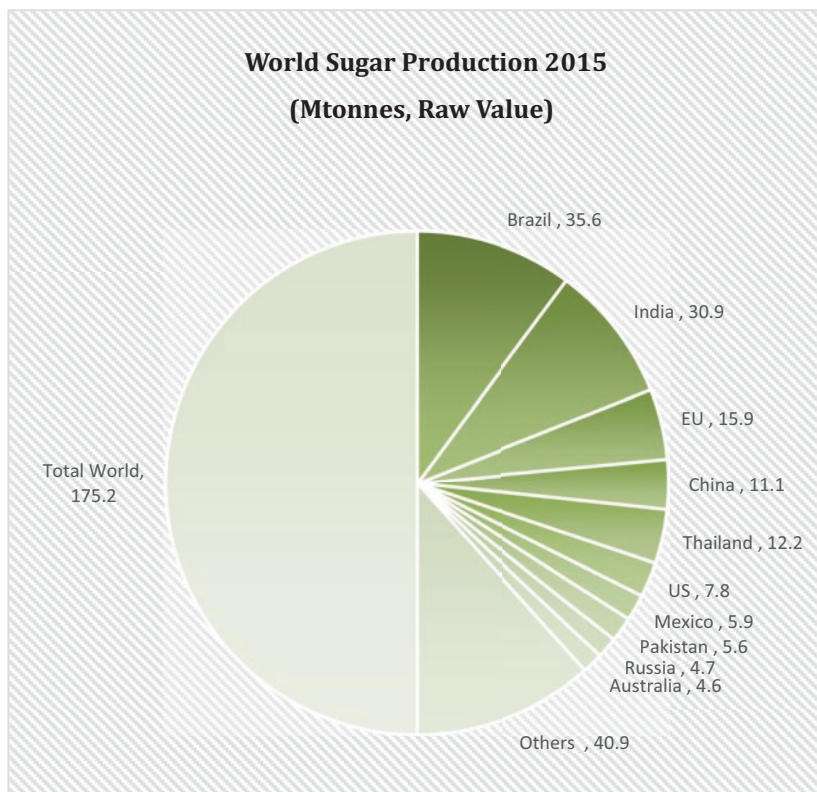


Fig. 6.2 Raw sugar production (tonnes) (Source: www.sucden.com, Courtesy of Sucden))

Table 6.2 Production information on other key staple agricultural markets

Country	Production (million tons)
<i>Corn</i>	
USA	316.2
China	177.5
Brazil	56.1
<i>Rice</i>	
China	197.2
India	120.6
Indonesia	66.4
<i>Wheat</i>	
China	115.2
India	80.7
USA	60.1

Source: Various sources, World Bank, Navitas Resources, USDA United States Department of Agriculture

Water Resources and Water Stress: A Key Driver

Food and agriculture are the largest consumers of water, requiring one hundred times more than we use for personal needs. Up to 70 % of the water we take from rivers and groundwater goes into irrigation, about 10 % is used in domestic applications, and 20 % in industry. Roughly half of fresh water drawn for human use disappears as a result of evaporation, incorporation into crops, and transpiration from crops. The other half recharges groundwater or surface flows or is lost in unproductive evaporation. Up to 90 % of the water withdrawn for domestic use is returned to rivers and aquifers as wastewater; industries typically consume only about 5 % of the water they withdraw.

Unfortunately water stress (as defined by the United Nations) is becoming more frequent and threatens the availability of fresh water for agriculture:

- In some regions, water use exceeds the amount of water that is naturally replenished every year. About one-third of the world's population lives in countries with moderate-to-high water stress, defined by the United Nations to be water consumption that exceeds 10 % of renewable freshwater resources.
- By this measure, some 80 countries, constituting 40 % of the world's population, were already suffering from water shortages by the mid-1990s (CSD 1997, UN/WWAP 2003).
- By 2020, water use is expected to be 17 % more than current levels for food production to meet the needs of the growing population.
- According to another estimate from the United Nations, by 2025, 1.8 billion people will be living in regions with absolute water scarcity, and two out of three people in the world could be living under conditions of water stress.

Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of fresh water resources in terms of quantity (aquifer over-exploitation, dry rivers, etc.) and quality.

In fact the situation is getting worse and it is not in Africa, but in the key farming belts in China and North America and Europe where the withdrawal rate of water from the ground for agricultural purposes is a large percentage of total water availability and creates water stress.

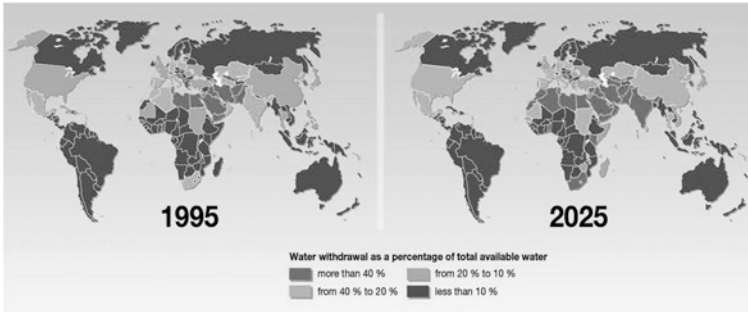


Fig. 6.3 Water withdrawal as a percentage of total available water (Source: United Nations Environment Programme (www.unep.org), Courtesy of GRID Arendal, Vital Water Graphics 2, 2009)

As illustrated in Fig. 6.3, North America and China, both key producing countries for corn and other cereals and soybeans, expect to have higher water stress due to the water withdrawal rates versus the total available fresh water.

As a result of fresh water availability concerns, there has been a sharp increase in the number of sea water desalination plants built to produce fresh water. At the moment, around 1 % of the world's population are dependent on desalinated water to meet their daily needs, but by 2025, the United Nations expects 14 % to be encountering water scarcity.

Desalination is particularly relevant to dry countries such as Australia, which traditionally has relied on collecting rainfall behind dams to provide their drinking water supplies. According to the International Desalination Association already, by 2011, 15,988 desalination plants were operating worldwide, producing 66.5 million cubic metres per day, providing water for 300 million people. By 2013 this number was already 78.4 million cubic metres or 57 % greater than in 2008.

The technology around solar powered desalination plants is becoming cost competitive with oil or gas fired desalination, though full scale commercial solar powered desalination plants are still somewhat in the planning stage at present. This presents the issue that in the short to medium term fresh water availability and the economic cost of that water could increasingly become linked to that of energy input costs.

Links between water prices and energy may not be felt for a long time and in some regions never (e.g., Canada with a small population and plenty of captured rainfall in lakes); however, the cost of water is expected to increase simply from the cost of infrastructure investment to distribute it. Domestic or home water prices are general controlled by regulation for domestic supplies,

but agriculture and industry may be hit first with increased prices so that water starts to reflect its true economic value/cost of production.

Whatever the cost of future water supplies, one thing is more certain: that as population keeps increasing more food and livestock feed (mainly cereals/soya) will need to be produced and more water applied to this purpose. Irrigated agriculture will continue to claim large quantities of water to produce the food required to feed the world. So this strong fundamental driver needs to be watched carefully.

There are some investable water related equity indexes that are also worth investigating since we do not have any tradable water futures contracts or water markets yet, although I do anticipate these will develop. The earliest index based on equities of firms involved in the water industry was the Palisades Water Index. Now there are several; and two notable ones are:

1. The S&P Global Water Index which provides liquid and tradable exposure to 50 companies from around the world that are involved in water related businesses. To create diversified exposure across the global water market, the 50 constituents are distributed equally between two distinct clusters of water related businesses: water utilities and infrastructure, and water equipment and materials.
2. The NASDAQ OMX US Water Index is designed to track the performance of the companies creating products that conserve and purify water for homes, businesses, and industries which are listed on a US exchange.

There has been talk in recent years of an exchange that actually prices and trades water being created perhaps in Canada, as it could be a strong fresh water exporter in its own right, although this has been debated for many decades and touches many political sensitivities. This potential though does keep coming up since Canada has roughly 20 % of the world's freshwater reserves.

Watching water as a driver of the fundamental underlying strength in crop pricing is that crops have very specific water requirements, and these vary depending on local climate conditions. However, the production of meat requires between six and twenty times more water than for cereals. The Chinese government promoted the use of pork in Chinese cuisine not just for historical reasons but in modern times it makes sense, as it requires less water and cereals to farm pigs. Cattle on the contrary require much more water in the supply chain and use a lot of cereals to feed them to maturity.

Extreme Weather Events

Some scientists believe that climate change will lead to more extreme weather events and in the past decade I have personally noticed more frequent extreme weather events affecting the commodity markets. We can argue over the causes of these more regular extreme events, but at a practical level they are happening and so we need to monitor these closely as part of our fundamental analysis. Extreme weather events include heat waves, droughts, strong winds, and heavy rains.

Climate models do not do a good job of predicting how extreme weather events might change under global warming. For example, models do not agree on whether the number of hurricanes in a warmer world would be more or less than current values, though scientists generally feel that the strength of the largest hurricanes will increase. The length of the hurricane season could also increase. Observational changes in the number of tornadoes per year may be due to increases in the number of people watching the skies and the growth of urban areas rather than any strict climate changes. It is not clear if observed changes in extreme weather events are part of long natural cycles, or if they are a response to climate change. Nonetheless, all of these events can be detrimental to crop growth. A 2015 report on extreme weather by a UK–US taskforce on extreme weather and global food system resilience (<http://www.foodsecurity.ac.uk/assets/pdfs/extreme-weather-resilience-of-global-food-system.pdf>) predicts that major shocks to global food production will be three times more likely within 25 years because of an increase in extreme weather brought about by global warming. The likelihood of such a shock, where production of the world's four major commodity crops (e.g., maize, soybean, wheat, and rice) could see falls by as much as 5–7 %, is currently once-in-a-century. But such an event could occur every 30 years or more by 2040, according to the study by this taskforce.

A shortfall in global production of major crops by 5–7 % could leave people in developing countries in a very difficult supply situation, with parts of Europe and the USA very exposed to the resulting supply instability. Extreme weather events in North and South America and north-east Asia—where production of the four major crops is concentrated—would most likely have the biggest impact on global food production. In 1988/1989, droughts in the USA and South America led to drops in the production of maize and soybean by 12 % and 8.5 % respectively.

To put the pressures on food production into real perspective, the United Nations issued a warning in 2014 that global food production must rise by 60 % by 2050 in order to avoid social unrest and civil wars caused by serious

food shortages. Rising demand is caused by increased wealth and a growing world population that is expected to reach 9.7 billion by the middle of this century.

Droughts

Droughts are damaging because of the long-term lack of water available to plants. They have been responsible for some of the more serious famines in the world, although sociological factors are also important. Heat waves can cause extreme heat stress in crops, which can limit yields if they occur during certain times of the plants' life-cycle (pollination, pod, or fruit set). Also, heat waves can result in wilted plants (due to elevated transpiration rates) which can cause yield loss if not counteracted by irrigation. Strong winds can cause leaf and limb damage, as well as "sandblasting" of the soil against the foliage.

Heavy rains that often result in flooding can also be detrimental to crops and to soil structure. Most plants cannot survive in prolonged waterlogged conditions because the roots need to breathe. In addition, flooding can erode topsoil from prime growing areas, resulting in irreversible habitat damage. Heavy winds combined with rain (from events such as hurricanes) can down large trees and damage houses, barns, and other structures involved in agricultural production. Hence the big move to genetically modified organisms, often referred to as GM crops, in order to make core food crops more resistant to drought, heat, pests, and infection.

Carbon Dioxide Increase

Scientists are in agreement that the levels of atmospheric carbon dioxide have increased in recent years. Prior to the Industrial Revolution, they were measured at 280 parts per million by volume (ppmv); currently the levels are around 380 ppmv and have been steadily increasing by 1.9 ppmv yearly since the year 2000, largely as a result of fossil fuel burning. Carbon dioxide is critical to photosynthesis (and thus plant growth). Scientists agree that even small increases in carbon dioxide result in more plant growth. It is likely that these higher levels will also result in higher harvestable crop yields.

However, this depends critically on the availability of sufficient water and the nutrients necessary for plant growth. Some scientists believe that one drawback to this increased productivity will be crops with lower nutrient and protein levels. If true, this could have a significant, widespread impact on

long-term human health if additional fertilizers were not incorporated into crop production.

In terms of fundamental drivers for oil and gas prices as they are both carbon dioxide producing industries, it is important to follow the developments in the controls and policies of greenhouse gas emissions. A lot of this is driven at the supra-national level by the United Nations Framework Convention on Climate Change (UNFCCC) (<http://newsroom.unfccc.int>).

Livestock

While crops can be impacted on by climate change, it is likely that farm animals would be even more susceptible. This would affect pork, cattle, and other traded commodities. It is expected that increased air temperatures will cause more stress on livestock. Both humans and livestock are warm-blooded animals, so both are affected by increased heat and humidity. During heat waves, livestock reproduction declines as well as their appetite, which lengthens the time needed to reach their target weight (most animals only eat about half of their normal quantities when they are heat-stressed). Stress can also increase the incidence of sickness, decrease rates of reproduction, and increase fighting among animals in confinement.

In some areas, night-time temperatures are even more above average than daytime temperatures during heat waves, which has resulted in increased mortality rates. Despite the warmer winter temperatures, global warming could have a negative overall impact upon livestock.

Increased carbon dioxide may result in feed and forage that is less nutritious even if there is more of it. It is likely that growers would be forced to use feed additives in order to see the expected growth gains in livestock, and to avoid illnesses. This increased cost to the grower would result in increased food costs to the consumer. Availability could also decrease if there is not enough water and nutrients in stressed soils to keep up with plant growth. Insect parasites and diseases could also become more prolific as global warming progresses. It is expected that, in cases of increased heat stress and humidity, most livestock will not be able to fight these diseases without the use of costly medicines.

Changes in the frequency and severity of droughts and floods could pose challenges for farmers and ranchers. Meanwhile, warmer water temperatures are likely to cause the habitat ranges of many fish and shellfish species to shift, which could disrupt ecosystems. Overall, climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and

same places as we have done in the past. The effects of climate change also need to be considered along with other evolving factors that affect agricultural production, such as changes in farming practices and technology.

Key Countries to Watch

We have discussed a lot about production of crops and fundamental drivers that can affect this, but for international traded commodity prices another key factor can be a disruption in exports of key crop commodities (Table 6.3).

In order to appreciate fully the supply demand dynamics, we need also to be aware of the key import countries. Monitoring their GDP and economic situation can help us understand the price drivers affecting the markets. Table 6.4 shows the biggest food and agricultural product importers.

Table 6.3 Major exporters of food and agricultural products

	Exports (\$ billions)				% of world total			
	1995	2005	2010	2013	1995	2005	2010	2013
World	361.0	538.9	872.1	1133.0	100.0	100.0	100.0	100.0
USA	42.2	48.3	82.7	107.0	11.7	9.0	9.5	9.4
Netherlands	34.1	42.7	64.8	74.0	9.5	7.9	7.4	6.5
Germany	21.2	35.2	53.0	68.0	5.9	6.5	6.1	6.0
Brazil	10.0	21.8	45.2	54.0	2.8	4.0	5.2	4.8
China	10.0	22.5	41.1	60.6	2.8	4.2	4.7	5.3
France	30.3	32.9	43.8	53.2	8.4	6.1	5.0	4.7
Belgium	11.5	23.6	31.3	39.4	3.2	4.4	3.6	3.5
Spain	11.5	21.8	29.9	37.9	3.2	4.0	3.4	3.3
Canada	11.7	20.7	28.5	36.0	3.2	3.8	3.3	3.2
Argentina	7.2	12.4	22.4	31.8	2.0	2.3	2.6	2.8
Thailand	10.7	12.4	23.9	27.2	3.0	2.3	2.7	2.4
Italy	11.2	17.0	25.6	30.1	3.1	3.2	2.9	2.7
India	5.4	8.0	15.5	33.6	1.5	1.5	1.8	3.0
Australia	9.7	14.3	18.7	24.9	2.7	2.6	2.1	2.2
Vietnam	1.6	6.3	13.4	21.2	0.4	1.2	1.5	1.9
New Zealand	5.6	10.3	15.3	20.6	1.6	1.9	1.8	1.8
Poland	2.1	7.7	14.4	21.5	0.6	1.4	1.6	1.9
Mexico	5.4	8.9	14.3	18.6	1.5	1.7	1.6	1.6
Denmark	10.9	13.2	16.0	19.2	3.0	2.4	1.8	1.7
UK	10.9	12.0	15.6	18.2	3.0	2.2	1.8	1.6
Russian Federation	0.8	3.1	6.2	14.0	0.2	0.6	0.7	1.2
Turkey	3.4	6.5	10.5	14.1	0.9	1.2	1.2	1.2

Source: From United Nations Conference on Trade and Development (UNCTAD), Merchandise trade matrix, exports and imports, annual, 1995–2013, © (2013) United Nations. Reprinted with the permission of the United Nations

Table 6.4 Major importers of food and agricultural products

	Imports (\$ billions)				% of world total			
	1995	2005	2010	2013	1995	2005	2010	2013
USA	29.4	55.2	74.5	93.2	7.8	9.8	8.4	8.3
Germany	38.1	44.4	60.6	72.4	10.2	7.9	6.8	6.4
Japan	45.9	44.8	52.9	58.6	12.2	7.9	6.0	5.2
UK	20.8	36.0	46.3	53.2	5.5	6.4	5.2	4.7
France	24.6	30.5	42.4	49.9	6.6	5.4	4.8	4.4
Netherlands	19.5	24.3	37.8	45.7	5.2	4.3	4.3	4.1
Italy	19.2	26.1	34.8	39.6	5.1	4.6	3.9	3.5
China	6.1	9.4	21.6	41.0	1.6	1.7	2.4	3.6
Russia	10.3	16.1	29.9	36.8	2.7	2.9	3.4	3.3
Belgium	9.3	19.7	25.3	33.2	2.5	3.5	2.9	3.0
Spain	11.7	20.7	25.6	28.0	3.1	3.7	2.9	2.5
Canada	8.2	14.5	22.8	28.4	2.2	2.6	2.6	2.5
Korea, South	5.9	10.0	16.3	21.9	1.6	1.8	1.8	1.9
Saudi Arabia	4.0	7.8	14.9	23.4	1.1	1.4	1.7	2.1
Hong Kong SAR	7.5	7.3	15.1	22.4	2.0	1.3	1.7	2.0
Mexico	3.1	10.6	14.6	19.6	0.8	1.9	1.6	1.7
UAE	2.0	3.8	11.5	17.0	0.5	0.7	1.3	1.5
Poland	2.3	5.3	11.4	14.9	0.6	0.9	1.3	1.3
Indonesia	3.1	4.1	9.5	13.1	0.8	0.7	1.1	1.2
Sweden	3.5	6.8	11.0	14.1	0.9	1.2	1.2	1.3

Source: From United Nations Conference on Trade and Development (UNCTAD),

Merchandise trade matrix, exports and imports, annual, 1995–2013, © (2013) United Nations. Reprinted with the permission of the United Nations

Major Agri-Exporters by Currency Value

Table 6.5 gives us more detail as to what countries are key for in terms of actual commodities. Thanks to customs and excise import/export data it is possible to get an idea of the key export commodities coming from countries. This helps us identify key countries for analysis of news and weather information that could in turn affect commodity prices we are trading or investing in.

Industrial Metals Market

China and India feature strongly in the core fundamental drivers of industrial metals, mainly on the demand side drivers. Economic growth in the USA, Europe on the demand side of finished goods, plus US interest rates also feature strongly in the demand for finished manufactured goods, which in

Table 6.5 Commodities and Major Producers

	Country	Commodity
1	USA	Soybeans
2	Indonesia	Palm oil
3	Malaysia	Palm oil
4	Brazil	Soybeans
5	USA	Maize
6	Brazil	Sugar, raw centrifugal
7	France	Wine
8	Argentina	Cake of soybeans
9	Indonesia	Rubber, natural dry
10	USA	Wheat
11	UK	Beverages, distilled alcohol
12	Thailand	Rubber, natural dry
13	Brazil	Chicken meat
14	USA	Cotton lint

Source: Navitas Resources and UN FAO

turn impacts on Chinese and Indian demand for raw industry inputs, such as industrial metals.

Business cycle analysis of fluctuations in economic activity is one of the key underlying fundamental approaches for metals. These fluctuations occur around a long-term trend (macroeconomic trend), and typically involve shifts over time between periods of relatively rapid economic growth and periods of relative stagnation or decline.

Industrial metals which are actively traded by investors are categorized as copper, lead, tin, zinc, aluminium, and nickel. Metals do particularly well during periods of economic growth, making them useful for implementing tactical views of economic recovery (Fig. 6.4).

Copper

Copper has a wide range of attributes which is why it has so many applications today. It was found to be a very efficient conductor of electricity and heat as well as being flexible, strong, durable, and resistant to corrosion. It is used in:

- telegraphic communications and electricity;
- heating, air conditioning, plumbing, roofing, and brass fittings;
- TV, radio, lighting, computers, mobile phones, electrical leads, adapters, transformers, and motors.

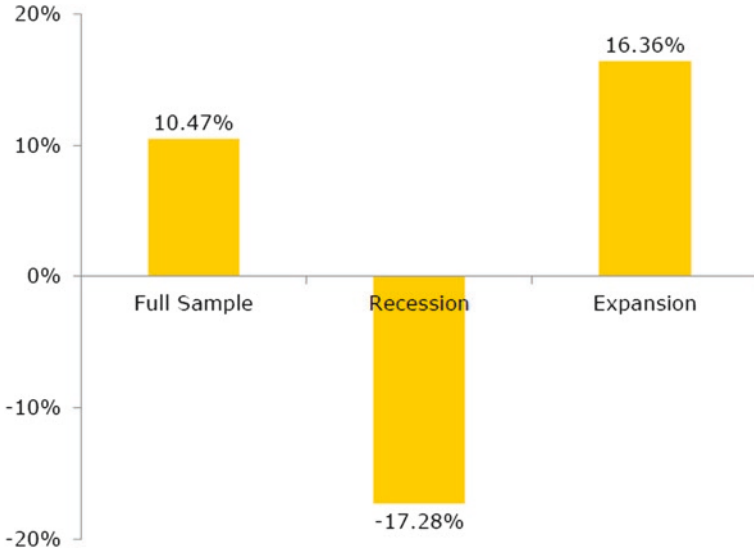


Fig. 6.4 Average industrial metals returns and the business cycle, January 1970 to end 2009 (Source: Navitas Resources UK Ltd)

Between 1900 and 2000, copper demand grew from 500,000 tons to around 13,000,000 tons (Fig. 6.5).

Per capita demand for copper rises as GDP per capita rises:

- Japan consumes around 12 kg per capita, North America consumes around 10 kg per capita, and Europe around 9 kg per capita;
- the large populations of China, India, Eastern Europe, and South America are all consuming less than 2 kg per capita, a huge indicator of what lies ahead for copper demand.

The wide production base means there are numerous factors that can affect production and therefore prices. In North and South America, production is often affected by labour unrest, in parts of Asia and Africa production can be affected by political unrest. Take for example the closures of the Bourgainville mine in Papua New Guinea and the decimation of production in Zambia. Weather is an important factor affecting supply, with floods and droughts either hitting the production process or the transport of raw materials. New production also takes years to commission as the scale of mining is large, takes enormous financing, requires endless environmental permissions, and needs extensive infrastructure as well. All these factors make it hard for the market to balance supply and demand. Emissions (carbon dioxide/methane)

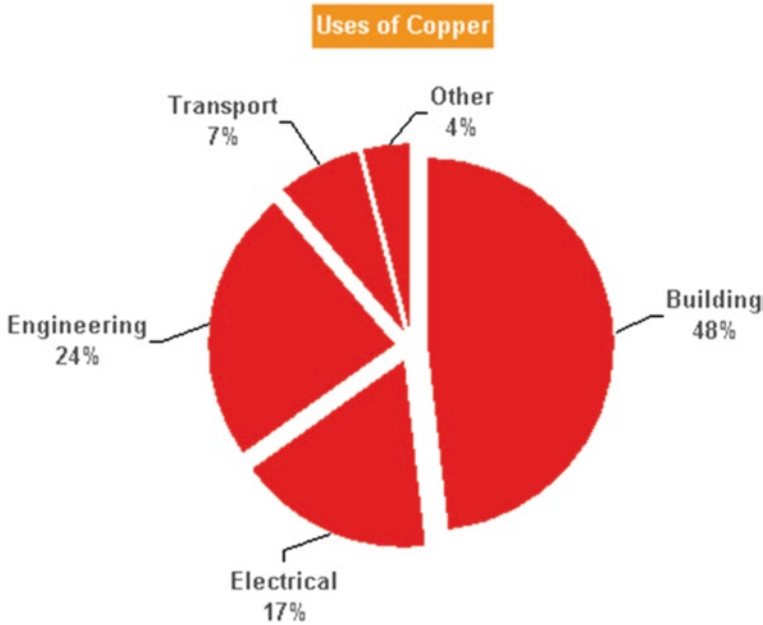


Fig. 6.5 Uses of copper (*Source: Navitas Resources Pte Ltd*)

now affect mining. Copper is traded on the London Metal Exchange, the COMEX market in the USA and the Shanghai Futures Exchange in China (Fig. 6.6).

Aluminium

Aluminium is a relatively new metal. It was discovered in 1827, but could not be produced efficiently until 1895. It competes with steel in many of its uses, but it has the advantage of being lighter, corrosion resistant, a good conductor of electricity, and strong when alloyed. It is widely used in the construction, transport, and packaging industries. In transport, it is used in the auto, aerospace, rail, and marine industries, where its strength, lightness, and resistance to corrosion means it is ideally suited for both the construction of the shell/bodies as well as many of the working parts, fixtures, fittings, and engine components. In packaging, it is used extensively for the protection, storage, and preparation of food and drinks. Its lightness, especially compared to glass, helps to reduce transportation costs. Aluminium foil is light, strong, and flexible and is a barrier to air, light, and micro-organisms. It is used in overhead and underground power-lines and power cables. Aluminium weighs only

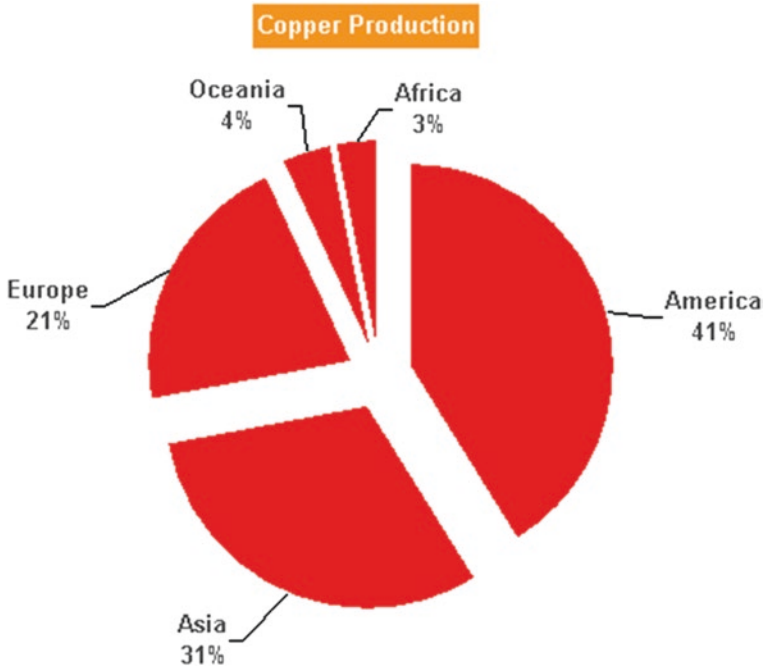


Fig. 6.6 Copper production (Source: Navitas Resources Pte Ltd)

one-third as much as copper and one kilogram of an aluminium cable can carry twice as much electricity as one kilogram of copper cable. Aluminium is traded on the London Metals Exchange and the Shanghai Commodity Exchange (Figs. 6.7 and 6.8).

Zinc

Zinc is one of the older metals, although for many years it was mainly used as an alloying metal with copper to form brass. Brass has a large market, especially in the construction and building supplies sectors; however, zinc is now primarily used to galvanize steel and is used in die-casting.

Galvanized steel is used extensively in construction and engineering, in roadside crash barriers, wire fencing, corrugated iron, street signs, and in the manufacturing of white goods.

It is also used in the auto industry to increase the corrosion resistance of cars, trucks, and trailers. The engineering industry also uses zinc pressure die-casting to produce thousands of components for cars, household items, and

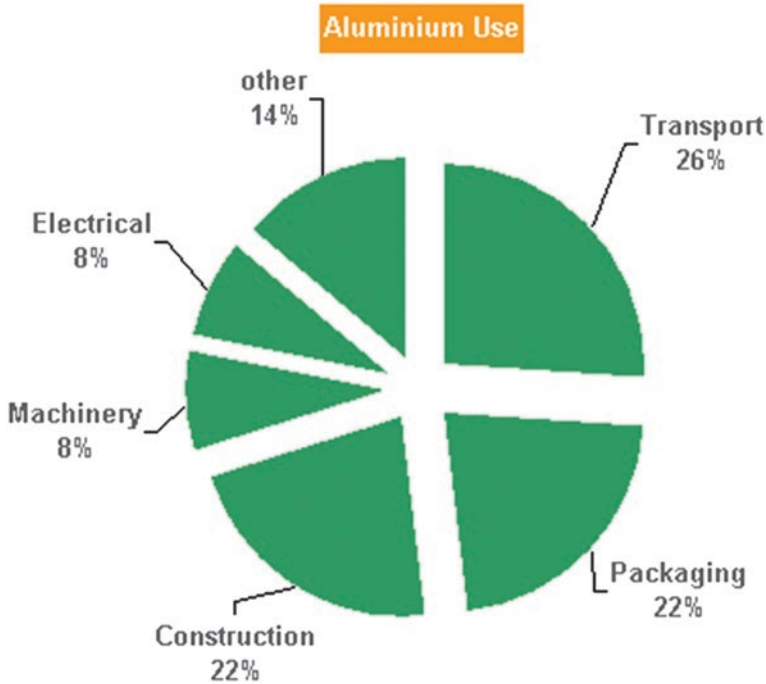


Fig. 6.7 Aluminium use (Source: Navitas Resources Pte Ltd)

industry in general. These include carburettors, casing, water pumps, mouldings, the side and back panels of washing machines, and cookers. Zinc sheet is used in some countries for roofing, guttering, and general weather-proofing (Figs. 6.9 and 6.10).

Zinc production, starts with the mining of bulk ores, which often contain a mixture of lead, zinc, and silver. Zinc concentrates can then be smelted to about 98 % purity, but demand for higher purity zinc, as traded on the LME (London Metal Exchange), now means that most zinc is produced electrolytically to produce high grade and special high grade zinc, with purities of 99.95 % and 99.99 % respectively—the latter being the benchmark grade for LME contracts.

Zinc is produced extensively in North and South America, Asia, Australia, and Europe.

This wide base of producers, combined with the industry's low level of integration between miners and smelters, means it has often been slow to react to poor market conditions. In the past, this has led to long periods of over-production with producers reluctant to make significant production cutbacks to keep supply and demand in balance.

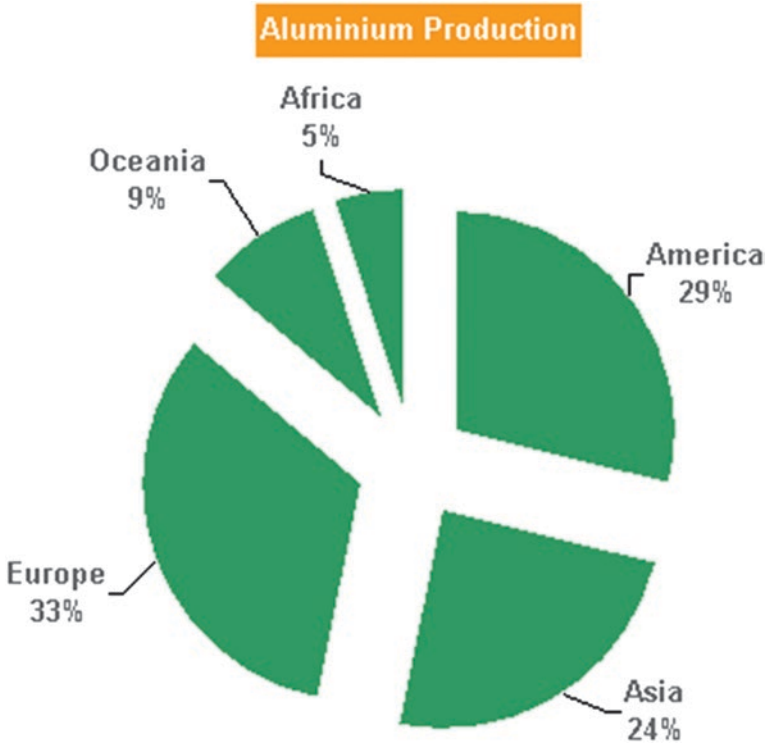


Fig. 6.8 Aluminium production (Source: Navitas Resources Pte Ltd)

Nickel

Nickel is a metal with a bright future as it is the main alloying metal needed to produce certain types of stainless steel. The strength and life span of products built with stainless steel is vastly superior to similar products built with non-stainless steels. Nickel's primary use (65 %) is in the manufacturing of stainless steels, with a further 20 % of nickel consumption being used to produce other steel and non-ferrous alloys, including super alloys; 9 % of nickel is used in electro-plating and 6 % is used in coins and nickel chemicals (Figs. 6.11 and 6.12).

Nickel occurs as oxides, sulphides, and silicates, with nickel ores mined in about 20 countries and smelted or refined in about 25. Primary nickel is produced and used in the form of ferro-nickel, nickel oxides, and other chemicals, and as more or less pure nickel metal. Nickel is also readily recycled in many of its applications, and large tonnages of secondary or "scrap" nickel are used to supplement newly mined metal. Nickel production has for a long

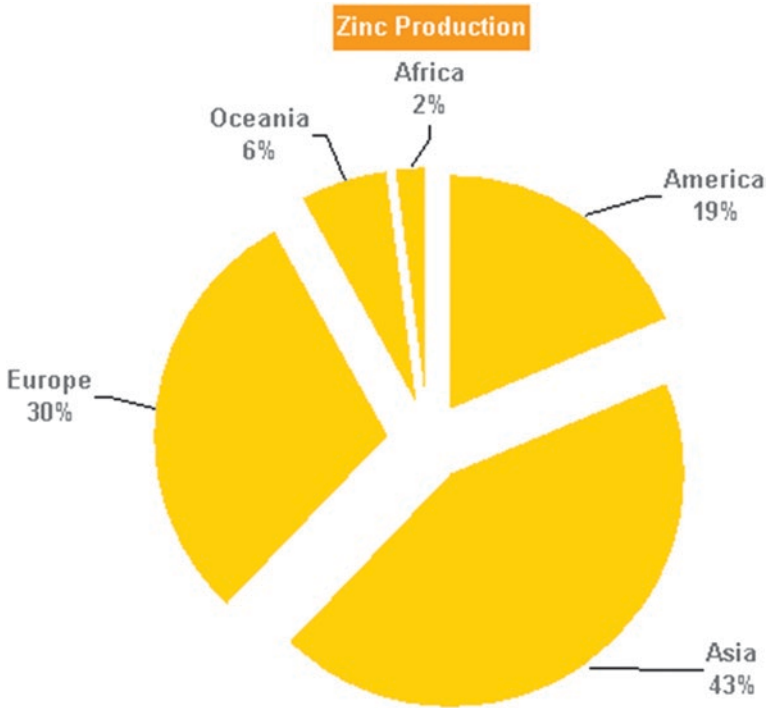


Fig. 6.9 Zinc production (Source: Navitas Resources Pte Ltd)

time been in the hands of only a few large producers, with the largest producer base in Russia. The combination of a small producer base has meant that the nickel supply has at times been volatile. It is traded on the London Metal Exchange.

Precious metals

Gold is the precious metal which nearly all fund managers flag as a strong long-term investment. This derives mainly from its role as an alternative to depreciating currencies, weakened by the effects of quantitative easing.

Although gold has some industrial applications, it is a monetary asset and its prime driver is investment demand. The value of gold is determined by the market 24 hours a day, nearly seven days a week. It trades predominantly as a function of sentiment; its price is less affected by the laws of supply and demand.

Gold's stability and capacity to rise in price can also be put down to the fact it does not deteriorate, so the total world's supply is actually quantifiable; it is

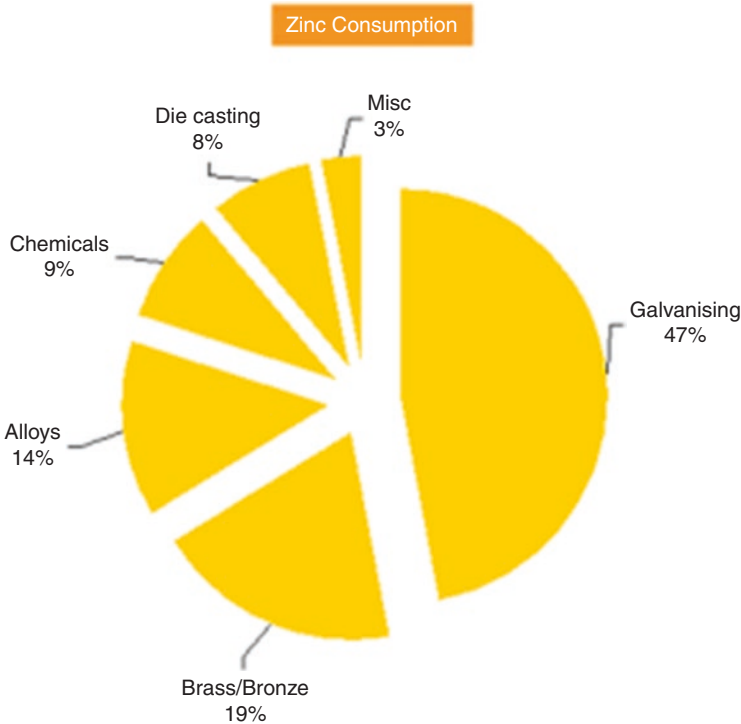


Fig. 6.10 Global Zinc Demand split (Source: Navitas Resources Pte Ltd)

also increasingly difficult to extract in large amounts, in particular in South Africa, the largest provider to the market; and it can be both traded and held as a physical asset.

Gold is a chemical element with a yellow appearance. It is used in jewellery design, in monies, electrical contacts, decoration, and in medicine. Data published by the United States Geological Survey lists the top producing countries for gold are China, Australia, the USA, Russia, and South Africa. The actual tonnage produced each year varies so the positions of the countries are always changing; however, they are generally always the core countries with the highest producer rankings.

- *China.* China became the world's number one producer of gold in 2011 with 345 tonnes of gold produced and remains in the top four rankings on a consistent basis. Unlike many other countries that are declining in gold production as its price rises to catch up with its economic value, China is planning on producing even more. China, alongside India, is traditionally the largest importer of gold as well.

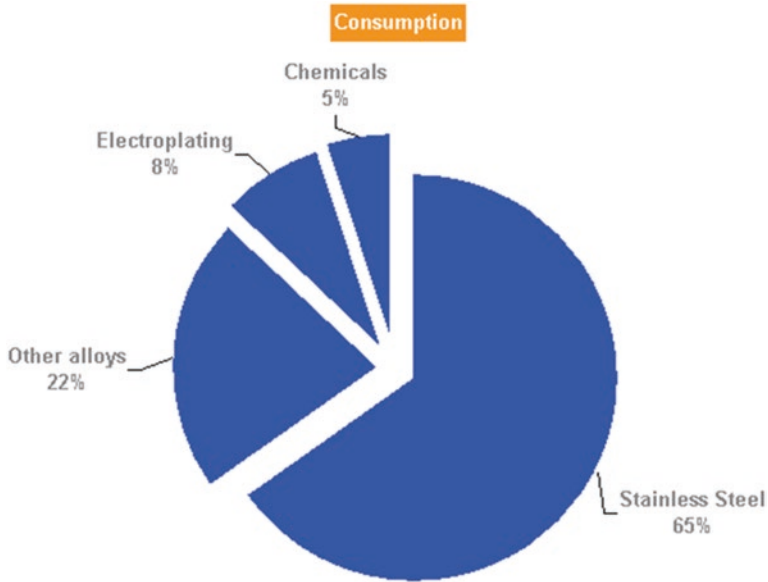


Fig. 6.11 Nickel Global Consumption Percentage split (Source: Navitas Resources Pte Ltd)

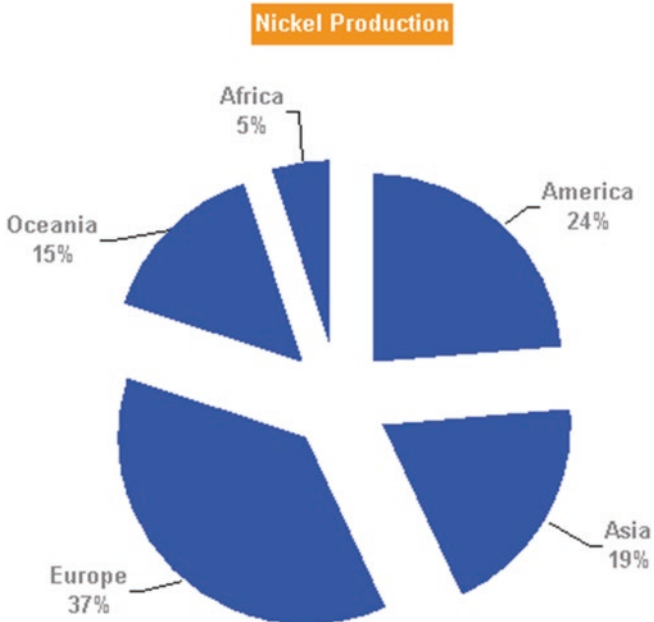


Fig. 6.12 Nickel Global Production Percentage split (Source: Navitas Resources Pte Ltd)

- *South Africa.* Known historically as a top producer of gold, South Africa's production has actually declined as China has taken the spotlight in production. South Africa has seen an 80 % drop in production within the last 40 years.
- *Russia.* Russia has become slightly more interested in gold purchases as it tries to compete with India and China. It plans to purchase large amounts of gold in the upcoming years, although its current annual production is usually around 190 tonnes.
- *The USA.* The production of gold in the USA is currently well above the averages of many of the top gold producing countries and only slightly below Australia and China, the respective second and top producers of gold in the world. Although the USA has not produced as much gold as it did in the past, the nation currently produces a healthy 230 tonnes per annum approximately.

In terms of key fundamental drivers, gold is a very political commodity as it is used as a non-cash central bank reserve metal. Many trading desks at banks have traditionally placed gold trading in the foreign exchange department, not in the metals or commodity trading desks. It is usually in demand as a safe haven to run to when there is war or panic over currency markets. People tend to buy gold when they are scared of a financial disaster or if they're afraid of inflation.

On the demand side, China and India are the two main countries that buy gold for jewellery. Another key factor that has affected prices is India changing its tariffs on gold imports which it has in recent years, many times within one fiscal year, and this can affect demand. While more traditional supply/demand factors of gold as a commodity can affect the price, it is the supply/demand of gold as a currency that drives larger long-term moves.

The all-time record high in gold at the time of writing was \$1921 per ounce on September 9, 2011, and what drove prices to that level was quantitative easing (QE) by the US Federal Reserve board and by the bank of Japan and the possibility that QE might be applied in the eurozone as well. QE in this regard is essentially the printing of money by the central bank and injecting cash into the economy to keep interest rates very low to try to kick-start economic growth. Gold traders at that time were thinking that Fed-led QE would ultimately prove inflationary; but that was not the end result, so gold prices eased off again.

Silver

The demand for silver continues to increase. Its applications include soldering, jewellery production, coverings for mobile phones to reduce bacteria, electroplating, mirror production, and medical equipment. Unlike gold, where only a small amount has disappeared from the markets in space applications, silver is used a lot, increasingly in health care due to its antibacterial properties.

Given its variety of applications in industry and medicine, which removes investment silver from the market each year, I have to admit I am surprised why it is comparatively cheap compared to gold, where the amount of investment gold existing in the world keeps increasing year on year. Gold and silver still maintain some strong price correlation links, and generally the overall long-term trends up and down are in unison.

The main producing countries for silver are Mexico, Peru, and China. In terms of fundamental drivers, investors need to keep track of new applications for silver that could raise demand and be aware of mining outages, flooding, earthquakes, and mining issues in the main producing countries that could slow or halt supply.

Platinum Group Metals

The platinum group metals (PGMs) are platinum, palladium, ruthenium, rhodium, osmium, and iridium, and they are usually produced together. The uses of PGMs include jewellery, computer hard discs, fibreglass, alloys, and catalysts in motor vehicles. The motor industry is perhaps one of the largest users of this group of metals alongside the computer industry.

The United States Geological Survey lists the top producing countries for PGMs as South Africa, Russia, the USA, and Canada. In terms of concentration risk, and potential volatility in the commodity when just one country has mining strikes or political issues, platinum and palladium have displayed very sharp price rises due to concerns over supply. This is because more than 50 % of the annual production of these two elements comes from South Africa alone, which holds more than 90 % of the world's reserves of PGMs.

Energy Market Fundamentals

The international oil and gas markets are a complex system; the fluctuation of the world oil price is affected by many factors, among which the supply-demand relationship and inventory of petroleum and gas are believed to be

core. Other factors, such geopolitical factors, are indirect factors which sometimes people fear may affect supply or demand.

Since the 1990s, with economic globalization and the deepening and broadening of the IT revolution, the international financial market has witnessed rapid development and is playing an increasingly important role in the world economy. As a world market of major energy products, the international oil market is completely exposed to the financial market, allowing derivative financial instruments to play a central role in petroleum trading, in particular the futures trading pricing index and hedge funds both play a critical role in the fluctuation of the oil market. In the financial market, participants' mentality, expectation, and judgement also generate significant impacts on the oil price. Wars, conflict events, and natural disasters also influence the oil market, though no longer through oil supply and transportation channels alone, but through the financial energy market—within a matter of seconds of the news being released by the media.

Typical fundamental drivers of the oil markets have been on the supply side from the OPEC oil producing countries— of which primarily Saudi Arabia is the key single supplier of over 10 million barrels per day—and on the demand side from the key growth hubs of India and China. There is still a valid argument that fundamental supply/demand factors drive prices in the long term; however, the cost of production has substantially increased as the easy to get at oil has been used up (except in the Middle East) and most of the new big billion barrel oil finds are offshore, deep under the ocean, with average per barrel extraction costs of between \$50 and \$70. In addition the average cost of shale oil production, which has been increasing dramatically over the past ten years, is on average around \$50–60 dollars per barrel to produce with current technology. Shale oil development has been big, particularly in Canada and the USA, where sandy tar-like oil is mined out of the ground and then heated to separate the sticky oil from the rocks and sand. In North America this has added about 1.5 million barrels per day to the oil supply in recent years, which has meant that the USA in particular has massively cut imports of crude oil, from 2010 onwards, from West Africa, Europe, and the Middle East. All this oil is now typically heading east to Asia. The world produces approximately 85 million barrels per day of crude oil, which is refined into petroleum fuels like gasoline, diesel, jet fuel, and fuel oil.

However, since 2008, there has been an increased disconnect at times from the supply/demand news and fundamentals on the one hand and the actual price on the other. Short-term price fluctuations in energy markets have been

increasingly led by what I would term external fundamental factors, that is interest rates, currencies, and equity market movements of the financial markets. These factors always had some impact on energy prices, but in the past it was slower.

The energy markets now are very sensitive to news such as Federal Reserve interest rate announcements or meeting comments, employment statistics in Europe and the USA, and Chinese interest rates and currency movements (since it is a major importer). China and India are the largest areas of energy import demand growth. Energy traders now have to be economists as well, monitoring interest rate announcements, currency movements, US dollar index futures price movements, economic announcements, and unemployment statistics in order to comprehend and appreciate fully what is a fair value for the current and forward oil and gas markets.

Changing economies are also now greatly impacting on prices. On one hand economic and political news from China and India can greatly imbalance or affect oil and gas imports and international prices as a result; on the other hand Middle East energy demand is growing so quickly, it can have the reverse effect and contribute to the lack of ability to export oil or gas to India and China. This is a key driver for civilian nuclear energy construction now taking place in the United Arab Emirates and plans for the same in Saudi Arabia and other oil and gas exporting countries to avoid using these resources domestically for power generation and instead to keep exporting them to other energy hungry countries like China and India. So, another new fundamental factor for the oil and gas industry and the price of these commodities is global nuclear energy policies. More nuclear energy in the Middle East and the Asia-Pacific region would greatly modify price expectations for liquid natural gas (LNG), international exported gas, and oil.

The one thing that energy markets are not short of is volatility, so everyday investment and trading opportunities do present themselves. Investors certainly appear to like energy markets. The results of a survey by the US Energy and Commerce Subcommittee (of the Senate) indicated that at the CME NYMEX market, the trade share of speculators in the total trading volume increased from 37 % in 2000 to 71 % in 2008. I have to say that the percentage of volume split between banks, traders, commodity hedgers and hedge funds, and short-term day trader speculators varies from day to day, but generally I think it is fair to say that most days more than 50 % of the volumes in most commodity futures markets these days are short-term speculators and long-term investors, with the balance made up of commercial traders who are hedging and managing physical commodity price risk.

The rise of the multi-billion dollar commodity investment industry means that, more and more, oil is purchased not for practical use as fuel, but by financial interests who plan to store it and wait for the price to rise. Today, the daily volume of trade in what is often termed as “paper” oil and gas often exceeds the actual demand for oil by 20 times, up from just five times a decade ago. Evidence I believe that financial speculation in oil and gas has indeed exploded and that these energy products now behave just like other financial assets, with large daily price swings that cannot be fully explained by actual supply and demand changes, but by the energy trader focused on changes in expectations about future market conditions. Industry commentators have been referring to commodities as the new asset class. Well the behaviour of some key industrial commodities like oil, gas, and copper, for example, since 2008, certainly seem to illustrate that they are being traded just like any other financial market, like shares or currencies.

The way oil fundamentals affect prices has changed in recent years. The big drops in oil I witnessed in 1996 and 2008 were in fact driven by large unexpected shocks to the actual supply or demand. In 2008, the oil price dropped as demand dried up during the global financial crisis and, back in 1996, during the Asian financial crisis a similar drop in the oil price was driven by both falling demand and by the new flow of supply from Saudi Arabia and other producers.

During the large drop in the summer of 2014, however, the shock to supply and demand was relatively small. In fact from June 2014 to December 2014, according to data from the US Energy Information Administration, global supply came in only slightly higher, and demand only slightly lower, than forecasters had predicted. There are additional explanations for the timing of this price collapse:

1. The first shift seems to have come in June 2014. And the big event that month was a clear signal from the Fed that it planned to end its quantitative easing programme and, with it, the era of easy cheap money that had been fuelling investment in commodities. At that point, investors were left to focus on just the deteriorating supply and demand fundamentals for oil.
2. The more oil behaves like a tradable asset, the more it follows the behaviour of the asset markets, which tend to adjust to changing fundamentals in sharp, dramatic fashion, before settling at a new level. In late October

2014 there was an OPEC meeting and Saudi Arabia, which is the main producer the market looks to to cut back or increase production (it is a swing producer) to balance prices, said it would not cut back and instead focus on grabbing more market share with Asian buyers. Evidence shows that Saudi starting discounting their crude oil even more than the already falling market price in order to attract more long-term buyers of their crude oil. Saudi always plays the long game in its strategy: yes to lower revenue in the short term, but in the long term prices will go back up and when they do the country will have increased revenues and a higher market share of supply to the Asian market where the main oil demand and gas demand growth currently sits.

OPEC, as mentioned earlier, does play an important role in terms of world oil supply. In most macro/global models of the oil market the OPEC supply is a crucial ingredient. OPEC in principle can influence oil prices by managing production quotas. Within the organization the key focus is on Saudi Arabia for oil exports. After the collapse in 2008, Saudi cut back oil exports by 10 % in the spring of 2009 when oil hit \$36 dollars per barrel in the USA CME NYMEX market (WTI crude oil)—and that was the bottom: the oil price quickly started to recover as a result.

In 2001 some of the leading gas market exporting countries formed the Gas Exporting Countries Forum (GECF). This is an intergovernmental organization of 11 of the world's leading natural gas producers, made up of Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Qatar, Russia, Trinidad and Tobago, and Venezuela. GECF members together control over 70 % of the world's natural gas reserves, 38 % of the pipeline trade, and 85 % of LNG production. The three largest reserve holders in the GECF—Russia, Iran, and Qatar—together hold about 57 % of global gas reserves. However, the GECF does not really have the same visible influence as OPEC which has been around since September 1960.

Gas prices

When people talk about gas prices they are often referring to the very visible and transparent “Henry Hub” gas price which is traded as a futures contract on the CME NYMEX market in New York. There are gas prices also traded actively in the UK and Europe, and international trading is now taking place in LNG; but the financial derivative market in the latter is still in its infancy and not easily accessible to investors.

The majority of gas investments made by hedge funds or exchange traded funds would be in the exchange futures markets in the UK, European, and US piped gas markets, literally the pipelines that take gas to homes and factories.

The drivers of a pipeline gas market are generally the demand for gas in the country, the supply sources of that gas coming in by pipeline from local gas fields, or imported as LNG by ship. As a result, unlike oil markets where more than 80 % of oil is shipped around the world, gas markets have the added complexity that most of it is delivered by a fixed pipeline network. That network has a fixed capacity, that is how much gas can physically flow through those pipes. In this case there is a very well-known and visible restriction on how much gas can be supplied in a given time, and as a pipeline market it is immediately affected by any change in demand. It gets cold suddenly, people need gas out of the pipeline, immediately supply must be available to keep the pipeline pressure up. So gas markets are very reactive in real time to temperature and weather changes. Short-term weather forecasts are very accurate these days but still can be wrong and major deviations from expected temperatures can have huge and sudden impacts on demand and supply and price.

The other major influence on pricing is how much of the gas goes to industrial use, fertilizer use, home heating, or even power generation. This will vary from country to country. In the UK for example maybe 35 % or more of natural gas goes to power production. How this affects price is that in hot weather people may only need gas for making hot water at home or in factories, but not for heating; but if it's too hot in the summer gas demand by power stations may increase as people need electricity for air conditioning and cooling.

Other fundamental factors include overall GDP expectations for key demand countries of LNG, like Japan, Korea, Spain, and Taiwan. These countries are called FIRM markets for LNG as they must import for power and heating generation, so they usually will pay premiums in the market to secure cargoes of LNG as they don't have an indigenous energy resource to utilize.

Outside of the pipeline market, gas is traded in its LNG form. The pricing of exports from the USA will be linked to the CME NYMEX Henry Hub futures price (when exports are expected to start in 2017, initially to Japan); otherwise prices are linked to where the gas is to be delivered. For example LNG from Qatar bound for Japan or China or Singapore may be priced against Brent crude oil traded on the Intercontinental Exchange, but that bound for the UK could be priced against the UK NBP gas price index, or

if delivered to Europe probably via the Netherlands, and so would be priced against oil or the Title Transfer Facility which is a legal point of delivery into the Netherlands and from where it can go by pipeline to pretty much anywhere across Europe.

Another key fundamental driver for gas prices is whether there are any problems with a port facility/shipping facility that could affect delivery of LNG into a country. That kind of news would trigger buying in the paper financial gas markets as consumers of gas rushed to protect rising costs of whatever gas is left in the pipeline network.

Freight/Logistics Drivers

As over 80 % of oil gets shipped from A to B around the world, shipping costs are a key input, as are war-free access and pirate free access to the appropriate shipping routes to ensure timely delivery of petroleum products. As a result there are some key geographical hotspots in the LNG gas and oil markets which are key fundamental driver inputs for international energy prices:

1. *Straits of Hormuz*. 40 % of the world's oil sent by ship goes through this very narrow shipping channel which is also quite shallow, and so, even without political tensions or war in the area, a ship that is broken down or sunk in the straits can cause a major problem for the timely supply of oil. Huge volumes of LNG by ship go from Qatar and other producers via this narrow marine passage, and so any problems with this shipping channel would have a significant impact on the European gas market (the UK presently takes up to 20 % of its natural gas from Qatar as LNG) and also on the Asia-Pacific market, potentially affecting greatly power generation capabilities in Japan and Korea.
2. *Suez Canal*. This is a major shipping channel for oil and LNG from the Middle East to Europe. Problems here would create delays for LNG and oil, as the alternative is to go around South Africa and up past West Africa and into Europe, adding several weeks to the journey.
3. *Panama Canal*. The passage for LPG and other products from the US Gulf to Asia. The only alternative is to go all around the southern tip of South America and Argentina. Any issues with the Panama Canal from 2017 onwards could also affect LNG exports from the USA to Japan and Asia.

4. *Bosporus*. The very narrow shipping channel running through Turkey, connecting the Black Sea with the Mediterranean. This area can get very foggy and shipping traffic speed reduced. Accidental collisions have sometimes occurred despite modern radar technology. The Bosporus sometimes gets shut temporarily causing supply issues and concerns.
5. *Straits of Malacca*. Around 15 million barrels were reported to be going through this shipping channel between Malaysia and Indonesia. All oil exports from the Middle East into Asia go through this channel.

These are the key choke points for the oil and LNG business, and a closure or disruption to any one of them could cause unpredictable price fluctuations.

7

Applied Technical Analysis for Commodities

Timing is the key to any successful trading or hedging programme. But getting the timing right will always be more of an art than an exact science. However, there are some tools that can help to build up a clearer picture of when the market price trend may change, which in turn should provide an idea of market direction and timing.

An advantage of analysing price charts in efficient commodity futures markets is that it's all in the price. Non-quantifiable factors get quantified by the market reaction in an efficient market, so it's all in the price. So analyse the price!

To understand the market we need to observe what the participants watch in order to appreciate their state of mind towards the market, that is we need to understand the fear and greed psychology of the market. What are the majority thinking and feeling?

Since we are not trying to create our own view of the market, but in fact the reality is we will make more money by correctly interpreting what the majority of the market is thinking the market is going to do, or is doing. We may sometimes feel conflicted as our analysis of the market may differ from our own instinctive feel of the market situation or even our interpretation of the fundamental supply/demand picture. What we are trying to harness is the view of the majority of people, and to then create a trading plan around that.

All the technical analysis discussed in this chapter can be applied for free on the interactive charts available at www.barchart.com for all key commodity futures markets.

As a result, the key starting point of technical analysis in any market is to appreciate what approaches/tools the majority of traders in our market are utilizing. This can differ from market to market. An example of this would be Japanese bond traders or equity traders in Tokyo, who may use a lot of the Japanese candlestick chart formations, though these are not used much by oil traders in London. So this approach would not have much impact in terms of influencing trader decision-making in London oil markets. Once we have reviewed broker sheets, analyst reports, views that journalists report and quote traders talking about, and understand the core tools our market is using, then we can set about learning to employ and interpret those tools.

Over the past 25 years, I have come to understand and observe many traders around the world in the commodity markets and the following notes are based on the core tools the majority of traders utilize. Most technical traders will use a combination of five or six tools. What is discussed in this chapter are some of the core tools that will broadly influence commodity traders around the world.

The definition of technical analysis:

- Technical analysts frequently utilize charts of past prices to identify historical price patterns.
- These price patterns are then used to forecast prices in the future.
- A basic belief of technical analysts is that market prices themselves contain useful and timely information. Prices quickly reflect all available fundamental information, as well as other information, such as traders' expectations and the psychology of the market.

The role of technical analysis:

- identify and predict changes in the direction of price trends;
- determine the timing of action: entry and exit decisions;
- help size the trading or hedging size of position (risk).

There are two main types of analysis that can be carried out: fundamental analysis and technical analysis. Fundamental analysis deals with the supply and demand factors of the physical energy world, whereas technical analysis is concerned with the price history of the market and what that can tell us about market participants' future anticipation. In reality, most people use a combination of the two—what could be termed “techno-fundamental” analysis. In other words, when a general technical picture of the market direction and

timing has been established, any new fundamental information can be incorporated into the picture as it is announced:

- a fundamental analyst must process new information and quickly determine a new intrinsic value, but a technical analyst merely has to recognize a movement to a new equilibrium;
- a technical trader using technical analysis will trade when a market price move to a new equilibrium is underway but a fundamental analyst finds undervalued markets that may not adjust their prices as quickly.

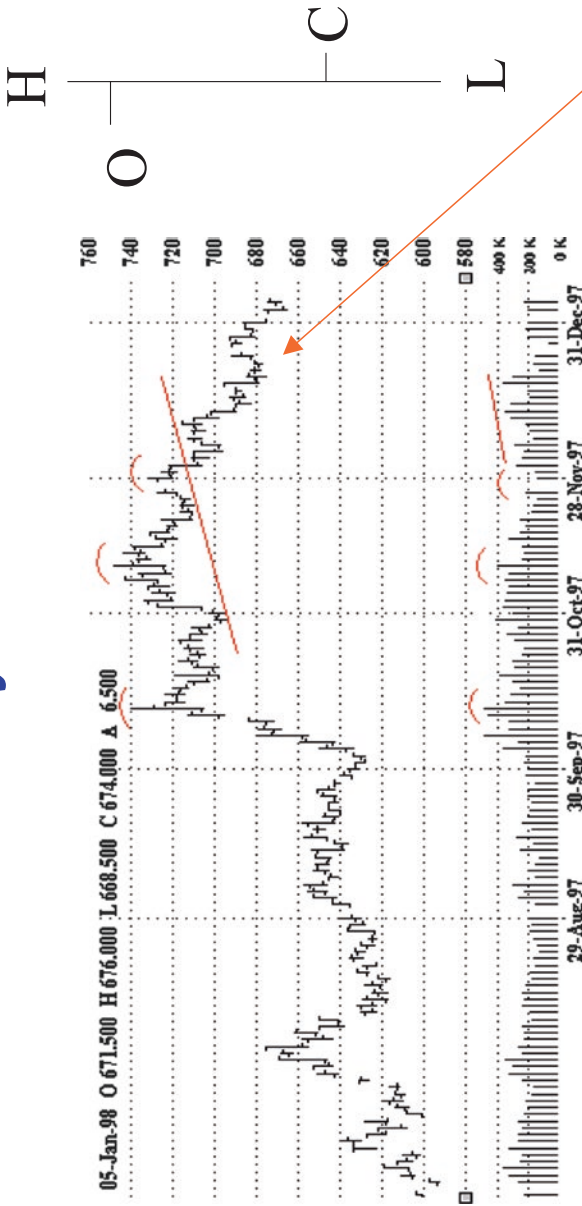
If a trader starts with a clear technical picture then whenever news or information comes into the market during the trading day, he or she should ask three key questions: Is this new news? Is this fresh news? Has the market already seen this? The last question is important because sometimes information or events are rumoured in the market and, as the saying goes, people “buy the rumour and sell the fact”. This can sometimes lead to a situation in which the market will fall on bullish news or rise on bearish news. In these instances the news or information was already in the price, so the confirmation of the news gave the signal for people who were speculating on the rumour to take their profit and close out their position.

This chapter presents the key technical approaches and tools that work well together when applied to major energy futures markets. Note the word “together”: technical analysis is a bit like detective work, in that it requires on-going attention to all the evidence that might support any theory on the direction of price trend and the timing of entry and exit.

What Is Technical Analysis?

In Fig. 7.1 each bar represents one time period. The figure is a daily bar chart, so each bar represents one trading day. The line on the left-hand side of the bar represents where the market opened (first traded price of that trading day); the top of the bar is the high of the day and the lowest level of the bar is the low of that day. The line on the right-hand side of the bar represents the closing price (last traded price/official settlement price). The arithmetic scale is the most popular one used for bar chart construction and shows price and time. The logarithmic scale is of little use for technical analysis, although it can be useful for bringing different commodities down to the same scale for analysing which markets are taking the lead in percentage terms.

Technical Analysis-Bar Chart



A bar chart displays a security's open (if available), high, low, and closing a prices.

Bar charts are the most popular type of security chart.

Fig. 7.1 Typical futures bar chart

There are a number of ways of defining technical analysis, but, in a nutshell, it is the study of market prices, with price charts being the primary tool (see Fig. 7.1). It is based on the idea that historical price movements of a commodity can be used to predict the sentiment and the expectations of market participants with regard to the future price trends.

Another way of looking at technical analysis is to see it as applied social psychology. That's because it sets out to recognize trends and changes in crowd behaviour. In many ways, technical analysis is all about trying to predict what the majority of traders believe will happen next, in terms of the price direction of the market. In fact, one of the main reasons that technical analysis works is simply that everyone believes it works. The majority of people trading in the markets are influenced by technical analysis and so its predictions can be, to some extent, self-fulfilling. It therefore follows that we must examine the key technical analysis tools that the majority will be basing their decisions on.

One thing is certain: technical analysis can help when making timing and market direction predictions. However, it is not enough to rely on a single technical tool; a combination of five or six tools and approaches is needed to help build up a good picture of market trend price targets and timing. It should also be remembered that there are certain types of market price movement that can render some technical analysis tools useless and too unreliable to follow. The key here is to recognize when technical analysis tools should be treated with caution.

The Principles of Technical Analysis

Technical analysis works on some key principles:

- That all known market fundamentals (news in the market) is accounted for and is reflected in market prices. The market has absorbed all the news, and the price represents a consensus on where price should be, based on all known data. This is certainly true in efficient markets which have good trading volume (liquidity).
- That prices move in trends and trends persist.
- That market action is repetitive or cyclical.
- If we accept the fact that human emotions and expectations play a role in commodity pricing, we should also admit that our emotions play a role in our decision-making.

The key rules for anyone looking to use technical analysis are:

- Keep it simple.
- Go with technical analysis tools and approaches that most of the world will be looking at. After all, you are trying to predict what the majority of traders are thinking. So it is important to watch the tools that they will be looking at, which in turn will affect their own perspective on future price trends to some extent. It is also useful to refer to news agency reports on the market, as these often discuss technical analysis tools. You can be sure that these tools will have some bearing on perceptions of future trends.

Bulls and Bears

The origins of the terms “bull trend” (market moving higher) and “bear trend” (market moving lower) come from the days of the early commodity markets in London. At the time, bull fighting and bear fighting were both popular spectator sports in the city. The terms for the direction of financial and commodity markets are based on the way in which bulls and bears fight. A bull will attack with its horns, pick up its opponent and throw him up in the air; whereas a bear will stand up on its back legs and drop down on top of its opponent, crushing him with its weight (Fig. 7.2).

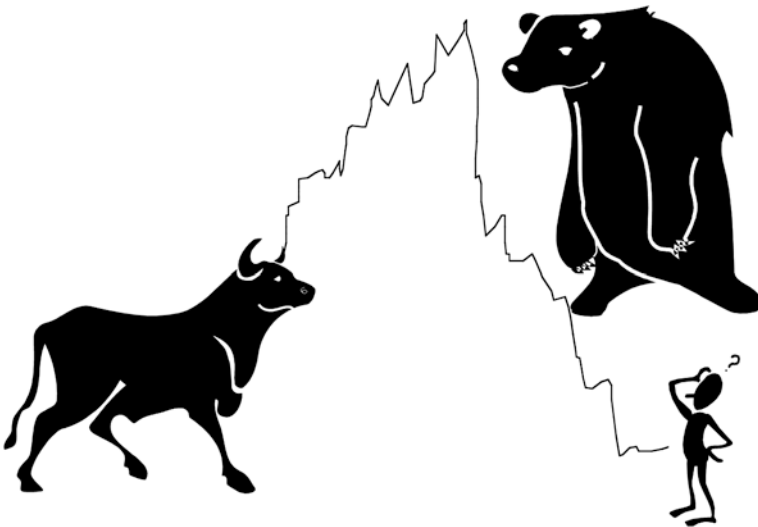


Fig. 7.2 Bulls and bears

The Technical Analysis Bar Chart

A History of Technical Analysis

The roots of modern-day technical analysis are in Dow theory, developed around 1900 by Charles Dow. Stemming either directly or indirectly from Dow theory are principles such as the trending nature of prices, prices discounting all known information, volume mirroring changes in price, and support and resistance. Of course, the widely followed Dow Jones Industrial Average is a direct offspring of Dow theory.

The price of a commodity represents a consensus. It is the price at which one person agrees to buy and another agrees to sell. The price at which an investor is willing to buy or sell depends primarily on his or her expectations. If he expects the security's price to rise, he will buy it; if the investor expects the price to fall, he will sell it. These simple statements are the cause of a major challenge in forecasting commodity prices, because they refer to human expectations. As we all know, humans are not easily predictable. This fact alone will keep any mechanical trading system from working consistently.

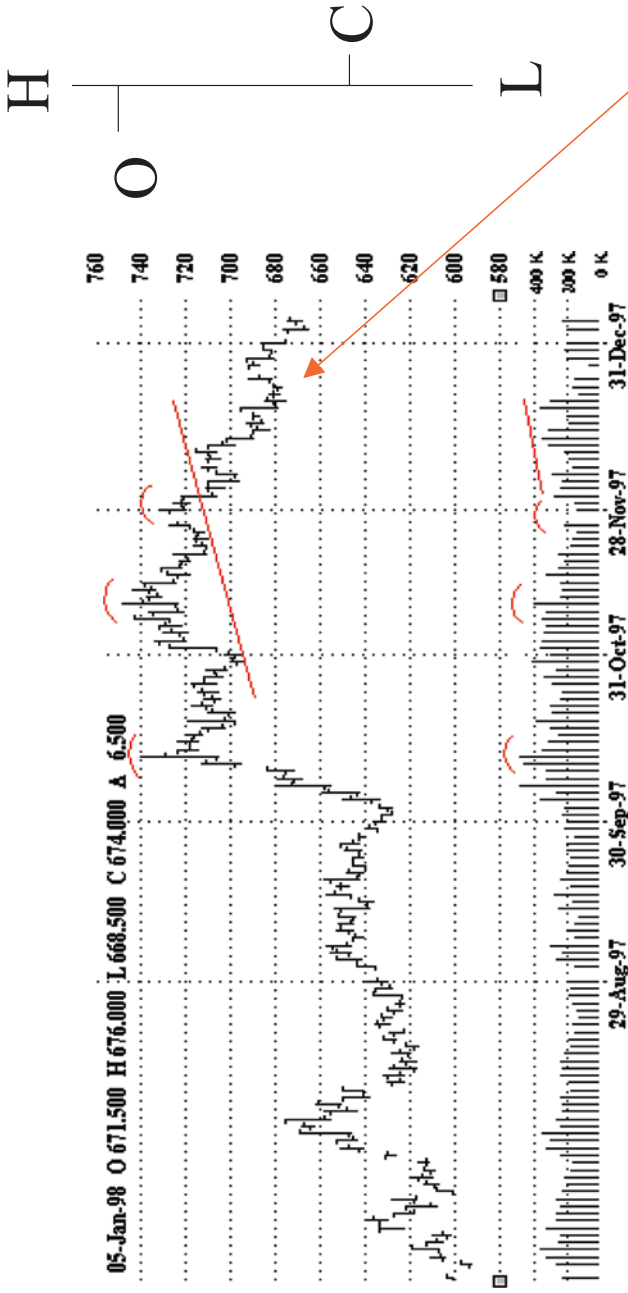
Because people are involved, many investment decisions are based on criteria that might be considered not strictly relevant. After all, our confidence, expectations, and decisions in the market can all be influenced by a large number of factors, such as relationships with family, neighbours, and employer—or even traffic, income, or previous success and failures, none of which could ever be successfully quantified in a statistically based model.

Trendlines

Before getting into any mathematical analysis calculations, there is a lot of information and guidance on future price movements that we can extract from the basic open, high, low, and close price chart (Fig. 7.3).

The concept of trend is essential to this approach to technical analysis. Generally, the trend is simply the direction of the market. More precisely, market moves are usually a series of zigzags, resembling a series of waves with fairly obvious peaks and troughs. It is the overall direction of these peaks and troughs which constitute market trend.

Most of the time, traders watch for a change in trend and subsequent confirmations that the trend is changing or has changed before acting on that information. Trendlines play an important part in illustrating that a change has been made and also give traders an indication of the price levels that



A bar chart displays a derivatives open (O) (if available), high (H), low (L), and closing (C) prices.

Bar charts are the most popular type of technical chart.

Fig. 7.3 Bar charts (Courtesy of [Barchart.com](http://www.barchart.com) (www.barchart.com), 2015)

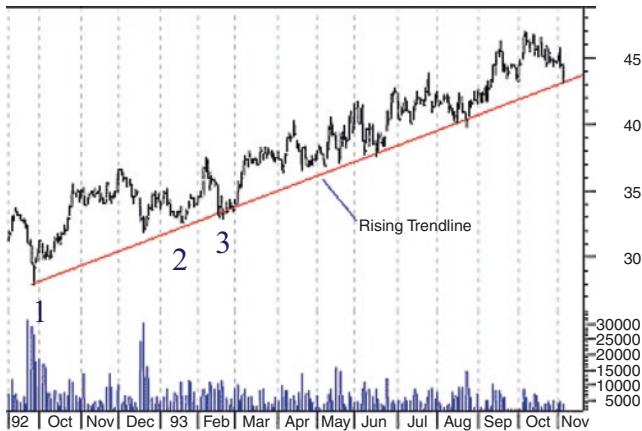


Fig. 7.4 Uptrend or bull trend (Chart sourced from and © FutureSource UK Inc.)

might trigger a price change or a new buying or selling interest. Trendlines should be drawn off two price points: a high or low and the earliest price points that can be found. The trendline should then be confirmed by a third test as illustrated in Fig. 7.4.

Other Notes on Trendlines

The relative steepness of the trendline is also important. In general, most trendlines tend to approximate to an average slope of 45 degrees. Such a line reflects a situation where prices are advancing or declining at such a rate that price and time are in perfect balance. It is rare to find a trendline which is exactly at a 45 degree angle, but we can say that, in a bullish market, if the trendline is too steep (above 45 degrees), it indicates that prices are advancing too rapidly and that the current steep move up will not be sustained.

With Reference to Fig 7.6 below. The following observations can be made on the trendlines drawn in:

- [A] Support trendline initially holds as support but is then broken.
- [B] Support trendline holds as support and then resistance and then support again (it is quite common for a trendline to offer both support and resistance).
- [C] Resistance trendline then becomes support a few months later (Figs. 7.6, 7.7 and 7.8).

Here market hanging around support trendline
But does not close below trendline and volume did not increase



Fig. 7.5 In this illustration the market is hanging around support trendline but does not close below trendline and volume did not increase (Chart sourced from and © FutureSource UK Inc.)



Fig. 7.6 IPE Brent Crude Oil (Chart sourced from and © FutureSource UK Inc.)



Fig. 7.7 NYMEX WTI Crude Oil (Chart sourced from and © FutureSource UK Inc.)

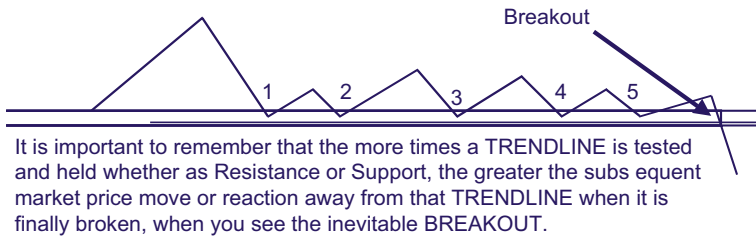


Fig. 7.8 Trendline and breakout

A breakout is where a trendline is finally broken (see [A] in Fig. 7.6), indicating that if good trading volume is seen at the same time, a change in price trend could be taking place. Other indicators help to identify when a trend change may take place, which is usually followed by a break in the trendline, giving confirmation of a trend change.

Support and Resistance

Alongside trendlines on charts, clear patterns of support and resistance can also be spotted. If the energy price is thought of as an on-going war between

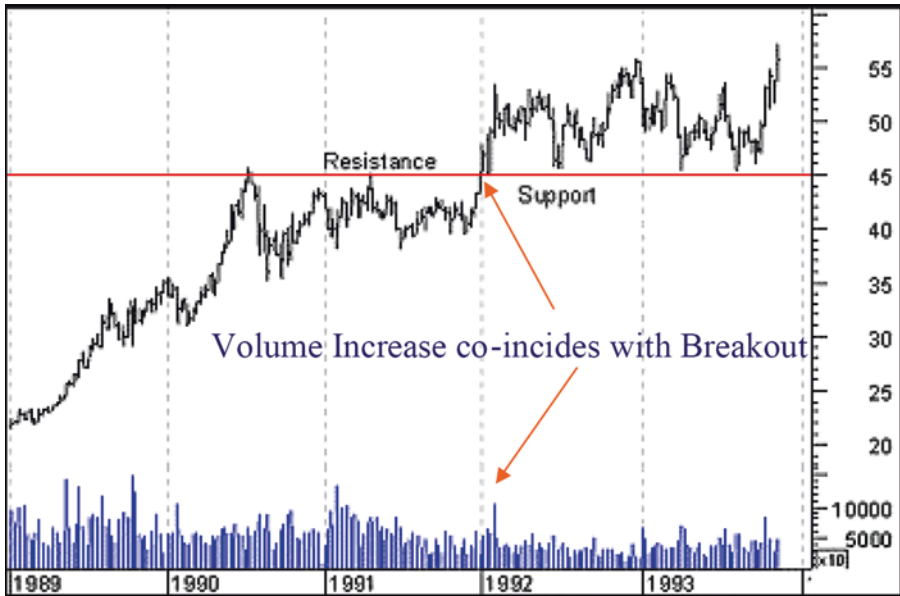


Fig. 7.9 Volume associated with the price breakout (Chart sourced from and © FutureSource UK Inc.)

the bull (the buyer) and the bear (the seller), then support and resistance levels can be seen as the battlefields in that war. In other words, support and resistance levels represent barriers to change.

A good way to quantify expectations following a breakout from a trendline or from resistance or support levels is to look at the volume associated with the price breakout. If prices break through the support/resistance level with a large increase in volume and the move-back is on relatively low volume (resistance becomes support), this implies that the new expectations will rule (a minority of traders are unconvinced) (Fig. 7.9).

Conversely, if the breakout is on moderate volume and the move-back period is on increased volume, this implies that very few traders' expectations have changed and a return to the original expectations (i.e., original price trend) could be seen.

Volume

Low volume levels are characteristic of indecision (if there are no major international holidays at the time) or an expectation of possible change. This typically occurs during price consolidation periods when prices move sideways in a trading range. Low volume also often occurs in the indecisive period

during market bottoms or tops. Sometimes traders and brokers will refer to the market “bottoming out” or “looking topy”. This means the market may reverse its previous trend.

On the other hand, high volume levels are characteristic of market tops when there is a strong consensus that prices will move higher. High volume levels are also very common at the beginning of new trends (i.e., when prices break out of a trading range). For example, just before market bottoms, volume will often increase due to panic-driven selling.

Volume can also help determine the health of an existing trend, by indicating whether it is strong or weakening. A healthy up-trend should have higher volume on the upward legs of the trend and lower volume on the downward (corrective) legs. A healthy downtrend usually has higher volume on the downward legs of the trend and lower volume on the upward (corrective) legs.

Other Types of Chart

Candlestick Charts

In the 1600s, the Japanese developed a method of technical analysis for the price of rice contracts. This technique is called candlestick charting. Candlestick charts display the open, high, low, and closing prices in a format similar to a bar chart, but in a way that highlights the relationship between the opening and closing prices. Candlestick charts are simply another way of looking at prices that don't involve any calculations.

They have their uses, especially for traders in markets such as bonds, but in the energy markets there is only one key formation that is worth looking out for, as it can give an early warning of a major trend change. This is the “DOJI” formation as illustrated in Fig. 7.10.

I have noticed this DOJI formation on three or four occasions over the past seven years, and when it has shown up in NYMEX or IPE futures contracts, it has been followed by a trendline support break, and in one instance the market dropped some \$3 dollars a barrel on IPE Brent in just a few days (Fig. 7.11).

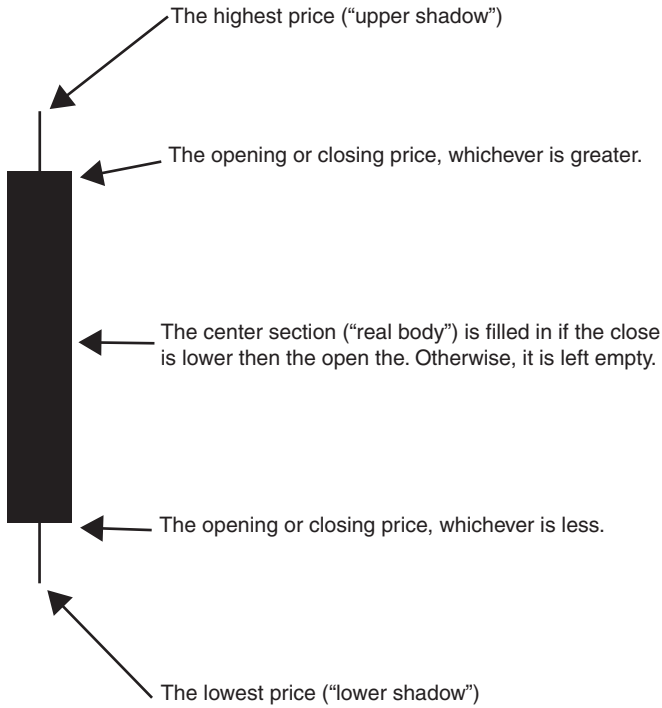


Fig. 7.10 DOJI formation

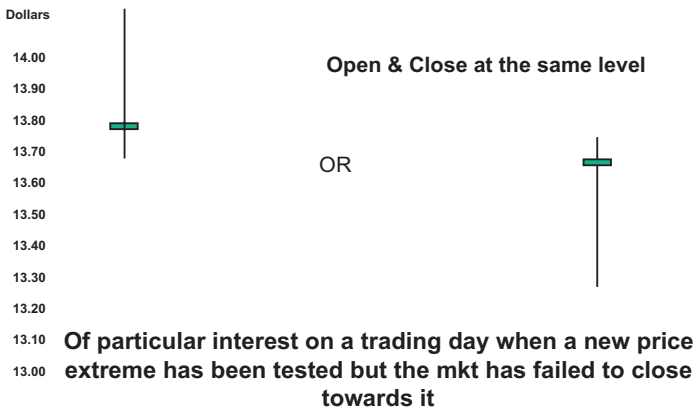


Fig. 7.11 DOJI formation example

The Volume, Open Interest, and Price (VIP) Relationship

It is possible to build up a good picture of what the market is thinking from a combination of trendline analysis (using charts, support/resistance levels), volume (using the total market volume), and open interest (OI) information.

Volume is a simple but key aid when analysing the market. It can give a good real-time signal as to the level of interest in a new trend starting or an old trend finishing. This, combined with OI (which is available in futures markets contracts but not equities), gives a very good combination tool to analyse whether a trend could continue or may be coming to an end.

OI is the net number of futures or option contracts in existence on an exchange, counting a bought contract and a sold contract as one open contract or a figure of 1 in OI terms.

The VIP Relationship

Another example of the VIP relationship:

1. The market is moving higher, volume is increasing, OI is increasing (Table 7.1). This shows that the bullish uptrend is well supported with new buyers coming into the market (Fig. 7.12).
2. The market is moving higher, but volume and OI are decreasing. This shows that there is no new interest in continuing the bullish trend and in fact, with OI decreasing, the market looks like it is closing out of (selling out of) previously bought (long) positions which could be showing a profit. This market trend is showing signs of weakness, so watch out for a change in direction.
3. The market changed direction in this example and started moving lower. Volume and OI both increased, illustrating new selling interest coming into the market, which in turn supported the bearish trend.

Table 7.1 Open interest explication

Price	Volume	OI	Market Indication
Rising	Increasing	Up	Strong bullish
Rising	Decreasing	Down	Trend weakening Watch for reversal
Falling	Increasing	Up	Strong bearish
Falling	Decreasing	Down	Trend weakening Watch for reversal

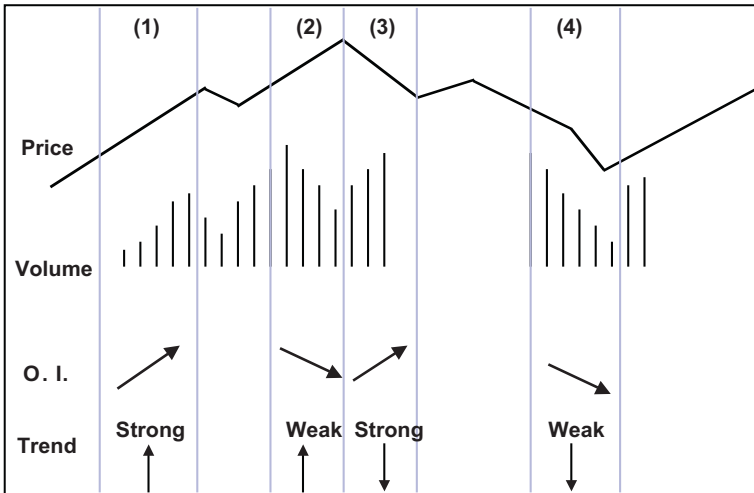


Fig. 7.12 Another example of the VIP relationship (Volume, open Interest, Volume)

4. In this part of the market trend example, the market is moving lower still but on lower volume and also OI is reducing, showing that some players are slowly losing confidence in the current trend continuing. As a result, they are buying back previously sold positions, taking profits, and closing out their positions, which is reducing OI.

End of Trend Signal

The end of a trend is often signalled when volume becomes progressively smaller and smaller each trading day and the price range of trading days (the distance between the high and low price of the day) is also reduced. The period between one trend nearing its end and a new trend starting can be a time when the market is waiting to make a decision on a new trend. The decision is made once a trendline is broken or key support or resistance triggers renewed trading interest with increased volume.

It is also worth emphasizing that a significant increase in volume should always be seen when a trendline or a key support/resistance level is finally broken. If not, then it may be a false breakout. This can sometimes occur when markets are very quiet. Indeed, some speculators may be tempted to force the market on low volume through a well publicized trendline level in an attempt to trigger some reaction in the market.

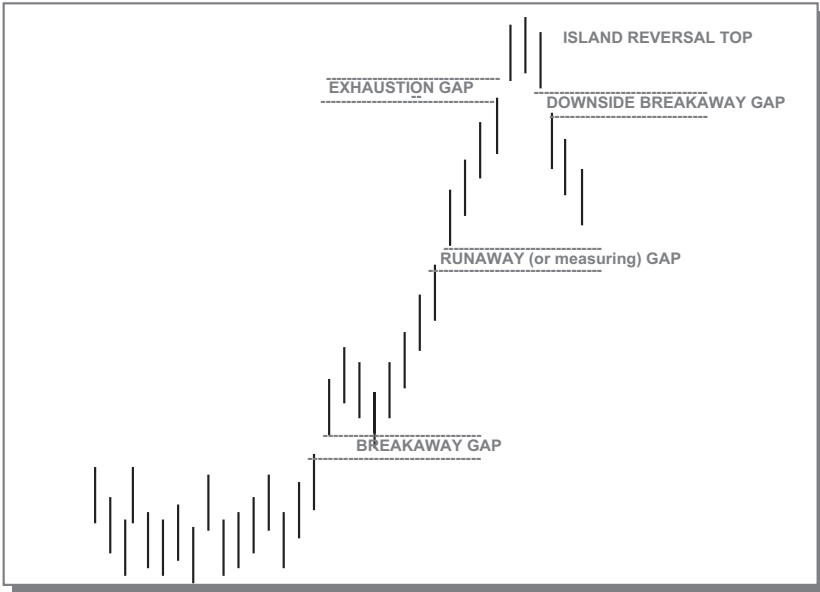


Fig. 7.13 Example of price gaps

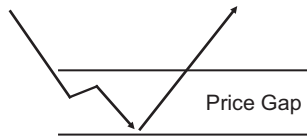


Fig. 7.14 Price gap chart 1

Price Gaps as Price Targets

Example of Price Gaps

Another good way of determining where the market may head is to look out for price gaps on price charts (Fig. 7.13). Energy futures markets often use price gaps as targets. A question many traders ask is how far back in time they should look for gaps. I have found that on daily bar charts (where each bar represents one trading day) you can often see that price gaps that have occurred as much as three months in the past are still watched by the market.

But price gaps are not just indicators of price targets. They can also indicate whether an old trend is going to start again. This can be seen in the case of a bullish trend, when a market breaks support and then comes down to aim for a price gap. If the market fills the price gap and holds the bottom of the gap

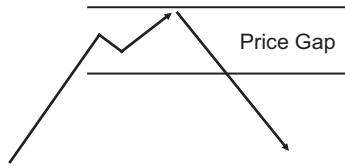


Fig. 7.15 Price gap chart 2

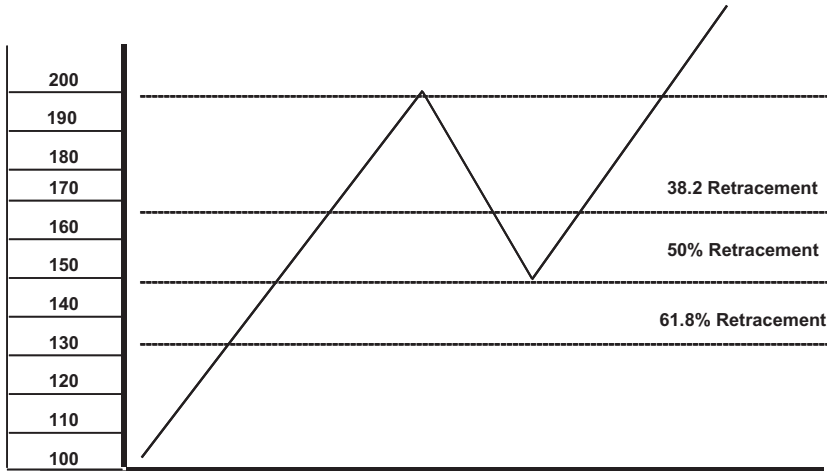


Fig. 7.16 Fibonacci retracement levels

(as shown in Fig. 7.14) then it can be expected that buyers will come back and that the bullish trend will have a new lease of life.

Example: The market has been in a bullish trend, but corrects downwards. The price gap is filled, but the market holds the bottom of the gap to continue the original bullish trend. In a case like this, renewed buying interest can normally be seen (Fig. 7.15).

Example: As shown in Figures 7.15 above the market has been in a bearish trend and corrects upwards. The price gap is filled, but the market holds the top of the gap to continue the original bearish trend. In this case, renewed selling pressure can normally be seen.

Fibonacci Retracement Levels

So far we have looked at trendlines which can help to identify trends and establish key support or resistance levels which can highlight a trend being broken. We have seen how volume data, OI data, and price data (VIP relationship) can

give early warnings of trends coming to an end and how much interest there is from market participants to help continue the current trend. We have also looked at price gaps as price targets that give traders an idea of how much the market might move in a particular direction. Another good way to predict price targets is by using Fibonacci percentage retracement (Fig. 7.16).

Fibonacci was the nickname of the thirteenth-century mathematician, Leonardo Pisano, who (re)discovered what is today known as the Fibonacci sequence. This is calculated by adding 1 and 1 together and then continuing to add the sum to the previous number to arrive at this numerical sequence. The sequence gives rise to the following numbers: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55 and so on.

Ratios of these numbers to each other give us important values: 61.8 %, 50 %, and 38.2 %. The prevalence of these ratios can be found all around us—from the double helix of DNA to spiral galaxies. The pioneering work of traders like W. D. Gann (Gann lines) and R. N. Elliott (Elliott wave theory) also showed that these ratios are prevalent in the financial markets. When properly applied to energy futures markets, they are surprisingly reliable, and the market watches these retracement levels avidly.

Energy futures markets (e.g., IPE, NYMEX) tend to reverse or consolidate once they reach one of these ratio levels (measured from the distance of the previous trend's reversal). This means that they can be very useful as position entry and exit levels.

There is a tendency for the energy futures markets to retrace down (during a bullish trend) or recover (during a bearish trend) by 50 % before continuing the original trend. In the example given in Fig. 7.16, the market retraces 50 % then carries on the original bullish trend. Besides this 50 % retracement, there are minimum and maximum retracements that should be allowed for: 38.2 % and 61.8 % respectively. What this means is that, in a correction of a very strong trend, the market may only retrace 38.2 % of the previous move. If a trader is looking for a buying or selling opportunity (depending on the trend) the trader can compute the Fibonacci retracement levels and use them as a reference point to enter or exit the market.

Chart Reading

To identify Fibonacci retracement levels, the most recent highest point and lowest point in the futures chart should be identified. Once this is done, you are ready to measure the retracement percentages.

Most energy futures contracts, after making long sustained moves in one direction, will eventually retrace a portion of the move, before continuing on

to extend it. Most commercially sold stock-charting software packages will automatically draw in Fibonacci levels between short, medium, and long term pivot points using traditional 38.2 %, 50 %, 61.8 %, and 100 % retracement levels. These levels can be watched as price targets or resistance points when selling (profit-taking on long positions) or, when calculating levels in the opposite (downward) direction, price targets as support points where short covering (buying back) may occur and fresh buying interest should come into the market.

For technical analysis, the important thing is that in the Commodity & Energy markets, people follow Fibonacci percentage retracements and in fact it works so well that sometimes the market has been seen to touch the Fibonacci target level exactly and then hold and recover its trend.

Mathematical Indicators

There are many types of mathematical indicators in the technical analysis field but here we focus on some key ones which work on a consistent basis for the energy futures markets. These indicators can give a trader a simple yet very effective tool for building up a view on price direction and timing, when used in parallel with bar charts, support/resistance levels, gaps, trendlines, volume, and OI information.

The Relative Strength Index (RSI)

The easiest way to describe how RSI reflects the market is to say that it treats the futures market price as if it were a rubber band. The rubber band can be stretched just so far, but after a certain point, unless it breaks, it is forced to contract. The idea was developed by J. Welles Wilder and presented in his 1978 book, *New Concepts in Technical Trading Systems*.

The RSI is a fairly simple formula:

U = average of upward price change

D = average of downward price change

$$100 - \left(\frac{100}{1 + \left(\frac{U}{D} \right)} \right)$$

Basically, the RSI equals the average of the closes of the up days divided by the average of the closes of the down days. The time frame specified determines the volatility of the indicator. A lot of technical analysis books and even news reports talk about a 9 period, a 14 period, and/or a 21 period time span for analysis. These time periods are usually applied most effectively to daily bar charts; however, there is nothing to stop you from applying the RSI to longer or shorter time frames, including intra-day, weekly and monthly charts.

It is probably a good idea to use two RSIs rather than one. Using one short time period and one longer time period can help a trader to assess how much an energy futures market is overbought or oversold. (For energy futures, a three-day RSI and a 14-day RSI are suggested.) “Overbought” means that the market price has moved higher too quickly in the time period under analysis on the RSI, while “oversold” means that the market price has moved lower too quickly in the period.

RSI Simple Calculation Method: Example

For a 14-day RSI calculation, the steps involved are:

1. add the closing values for the up days and divide this total by 14;
2. add the closing values for the down days and divide this total by 14;
3. divide the up day average by the down day average; this results in what we term the RS factor in the formula;
4. add 1 to the RS;
5. divide 100 by the number arrived at in step 4 above;
6. subtract the number arrived at in step 5 above from 100.

RSI periods recommended for energy futures are:

- 14-day RSI
 - If the RSI is over 75 %, the futures contract is overbought and it may be difficult for prices to move any higher. Prices should soon correct to the downside more severely than if the three-day RSI were overbought.
 - If the RSI is below 35 %, the futures contract is oversold and prices should find support, i.e. the market should find it difficult to move lower. Prices should correct to the upside.
- 3-day RSI: a very useful short term entry/exit indicator

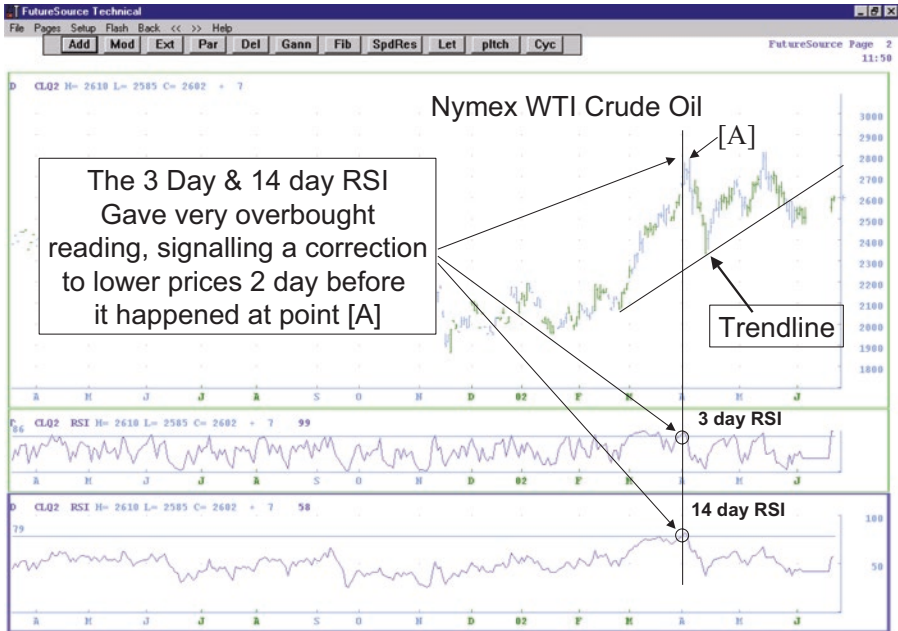


Fig. 7.17 NYMEX WTI Crude Oil showing RSI and Trendline information. (Chart sourced from and © FutureSource UK Inc.)

- If over 90 %, the market is very overbought and if the market is trading technically it will probably struggle to move higher and the market should have a good intraday correction to lower prices.
- If below 20 %, the market is very oversold and if the market is trading technically, it will struggle to move lower. In this case, the market should have a good intraday recovery to higher prices.

The guiding principle of the combined use of the 3-day and 14-day RSI is that if the market is looking overbought/oversold you can gauge that more than just a one-day price correction may be seen (Fig. 7.17).

Moving Averages

There are three types of moving averages available: simple, weighted, and exponential. The critical element in a moving average is the number of time periods used in calculating the average. When using hindsight, it is always possible to find a moving average that would have been profitable.

The 39-week moving average has an excellent track record in timing the major (long term) market cycles. In energy markets on daily bar charts, a 13-day moving average based on the closing (or last) traded price gives a very good buy/sell signal.

A 13-day simple moving average (based on the last market closing price) can also prove very profitable as a buy/sell indicator for the C&E futures markets. It is a Fibonacci number, but the reality is probably that this moving average has been highly publicized in the energy market and plenty of traders will be watching it closely.

As with all technical indicators, simple moving averages should never be used on their own as they do have some disadvantages. One such disadvantage is that you have to wait for the market close to get the final indication whether to buy or sell. However, it can be a very valuable confirmation tool to add to your other indicators and build up your view of the market.

Interpretation

The most popular method of interpreting a moving average is to compare the relationship between a moving average of the commodity price with the commodity price itself. A buy signal is generated when the security's price rises above its moving average, and a sell signal is generated when the security's price falls below its moving average. The drawback to moving averages is that they can create false signals if the market is "range bound", although they work really well in a trending market (Table 7.2). The length of a moving average should fit the market cycle you wish to follow (Fig. 7.18).

Bollinger Bands

The other very popular approach to analysing prices and whether price trends will change is the Bollinger Band. Bollinger Bands® are a kind of trading envelope. They are lines plotted at an interval around a moving average. Bollinger Bands® consist of a moving average and two standard deviations charted as one line above and one line below the moving average. The line above is two standard deviations added to the moving average. The line below is two standard deviations subtracted from the moving average.

Table 7.2 Schedule of moving averages

Trend	Moving average (days)
Very short term	5–13
Short term	14–25
Minor intermediate	26–49
Intermediate	50–100
Long term	100–200

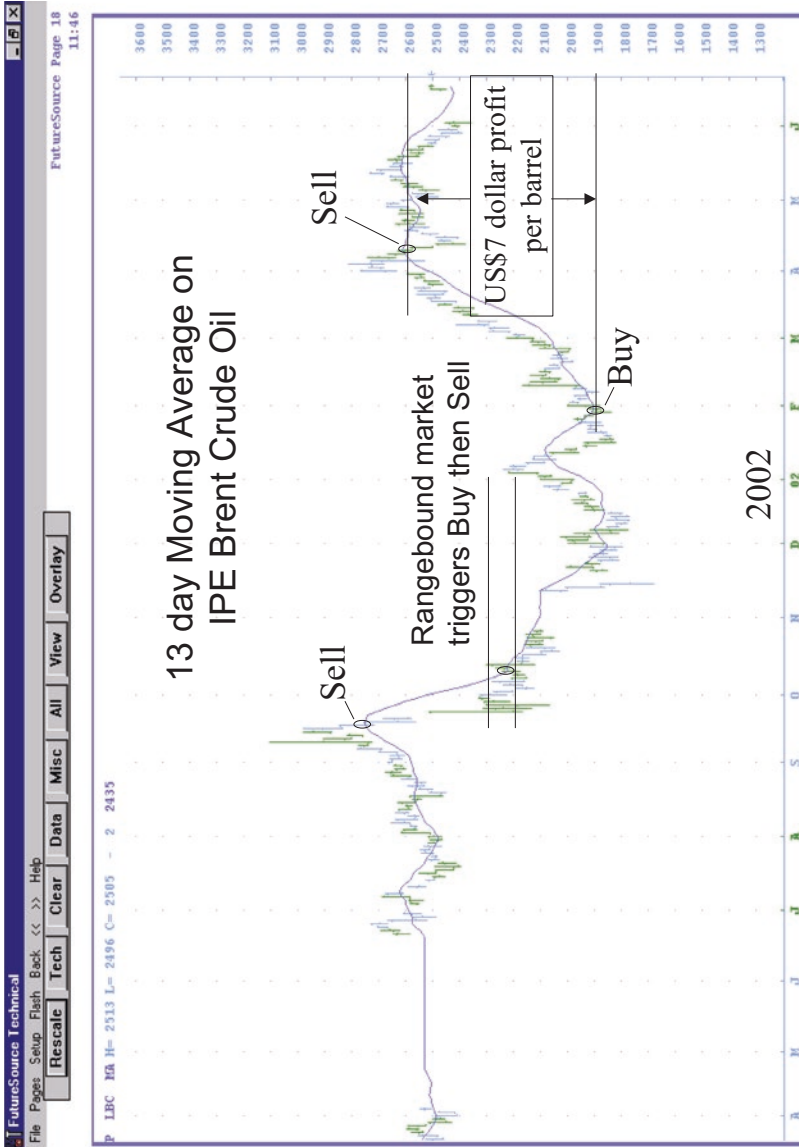


Fig. 7.18 NYMEX WTI Crude Oil (Chart sourced from and © FutureSource UK Inc.)

Traders generally use them to determine overbought and oversold zones, to confirm divergences between prices and indicators, and to project price targets. The wider the bands are, the greater the volatility is. The narrower the bands are, the lesser the volatility is. The moving average is calculated on the close.

Some authors recommend using Bollinger Bands® in conjunction with another study, such as the RSI. If the price touches the upper band and the study does not confirm the upward move (i.e., there is divergence), a sell signal is generated. If the study confirms the upward move, no sell signal is generated, and in fact a buy signal may be indicated. If the price touches the lower band and the study does not confirm the downward move, a buy signal is generated. If the study confirms the downward move, no buy signal is generated, and in fact a sell signal may be indicated.

Another strategy uses the Bollinger Bands® alone. In this approach, a chart top occurring above the upper band followed by a top below the upper band generates a sell signal. Likewise, a chart bottom occurring below the lower band followed by a bottom above the lower band generates a buy signal.

Bollinger Bands® also help determine overbought and oversold markets. When prices move closer to the upper band, the market is becoming overbought, and as the prices move closer to the lower band, the market is becoming oversold. The market's price momentum should also be taken into account. When a market enters an overbought or oversold area, it may become even more so before it reverses. You should always look for evidence of price weakening or strengthening before anticipating a market reversal.

Bollinger Bands® can be applied to any type of chart, although this study works best with daily and weekly charts. When applied to a weekly chart, the Bands carry more significance for long-term market changes.

The usual Parameters utilised by the industry for the Bollinger Band approach are as follows:

- **Period (20):** the number of bars, or period, used to calculate the study. Bollinger states that those periods of less than ten days do not seem to work well for Bollinger Bands®. He says that the optimal period for most applications is 20.
- **Band Width (2):** the half-width of the band in terms of multiples of standard deviation. Typically 2 is used. Bollinger suggests that if you reduce the number of days used to calculate the bands, you should also reduce the number of deviations and vice versa. For example, if you use a period of 50, you may want to use 2.5 as the standard deviation. For a period of 10, you may want to use 1.5 or 1.0. The application uses a default of 2.0 as shown in Fig. 7.19.

\$DOWI - Dow Jones Indu (Dow Jones)

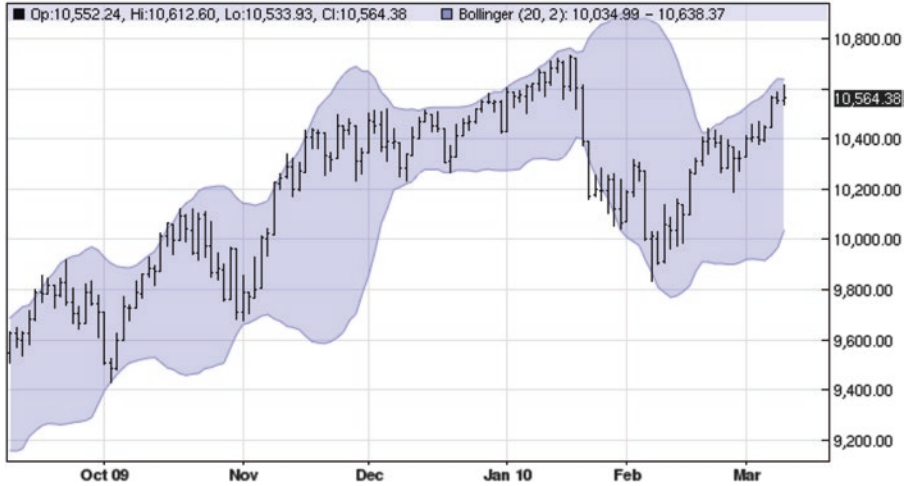


Fig. 7.19 Dow Jones snapshot (Source: www.barchart.com)

Chart Patterns

What Is a Price Chart pattern?

Chart patterns are formations which appear on price charts of futures contracts (in this context) that can be classified into different categories. The type of chart pattern observed can give some big clues as to whether the market is going to continue its current price trend or whether it might reverse. Some patterns will also give a clue as to how much the market may move.

How Many Groups of Chart Patterns Are There?

There are two major groups of chart patterns: reversal patterns and continuation patterns. Reversal chart patterns indicate that a reversal in the market price trend is in the process of taking place. Continuation chart patterns suggest that the market is consolidating: it is resting, perhaps because it was very overbought or oversold (this can be established by referring to the RSI level, as discussed earlier). Once this position has been relaxed the market will resume its original bull or bear trend.

By examining charts on a regular basis, a trader can develop a professional intuition and observational skill as to whether or not a chart pattern that is forming is a reversal pattern or a continuation pattern. The earlier this can be detected, the better.

Triangle Formations

During the development of triangle formations, volume should diminish as the price swings narrow within the triangle. The tendency for volume to contract is true of all consolidation patterns. The volume should increase significantly once the market breaks out of the triangle formation. A lack of volume increase may warn that the market is not confident of this direction. A benefit of the triangle formation is that it gives both an indication

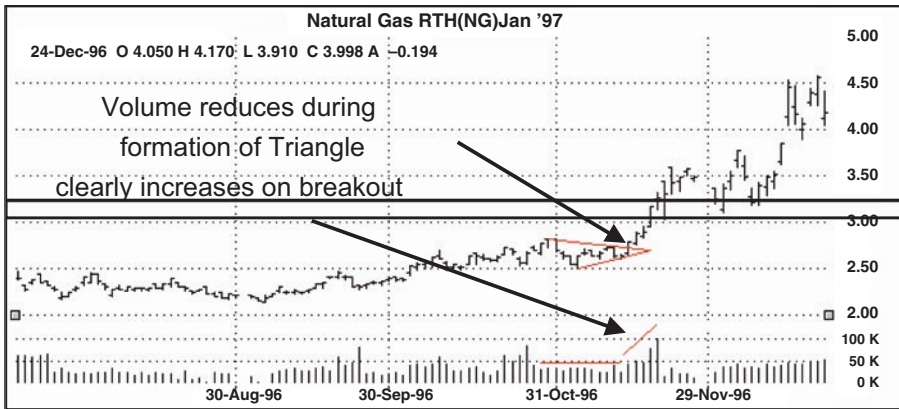


Fig. 7.20 Symmetrical triangle at the beginning of an uptrend (Chart sourced from and © FutureSource UK Inc. Natural Gas RTH)

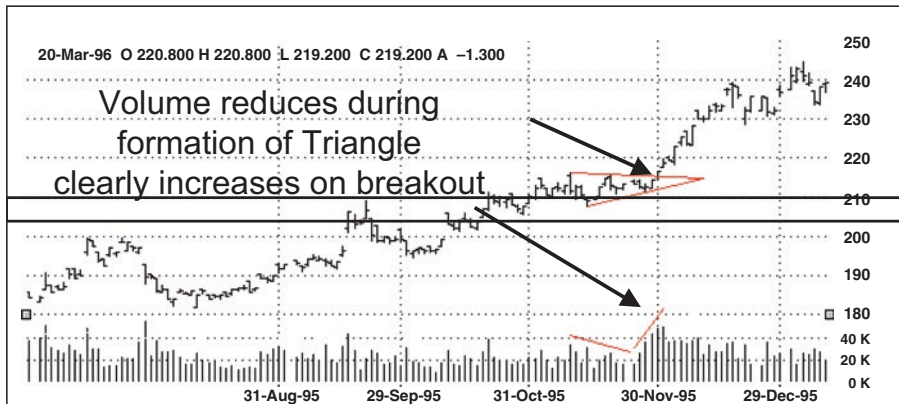


Fig. 7.21 Continuation pattern (Chart sourced from and © FutureSource UK Inc.)

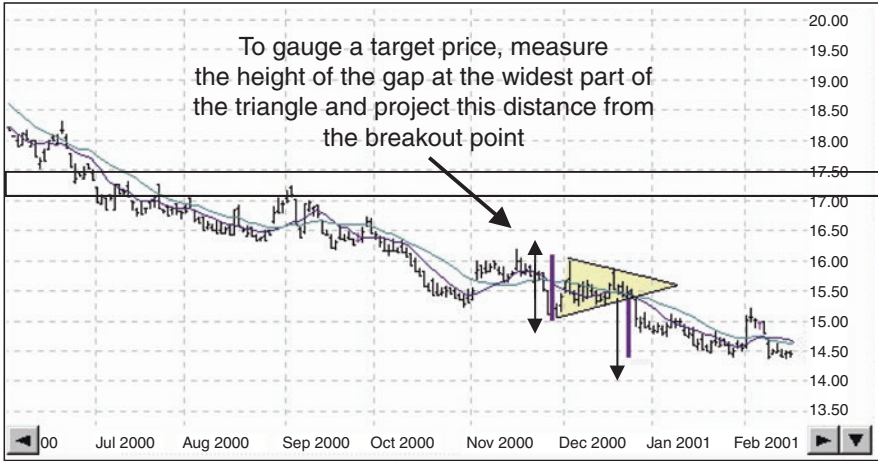


Fig. 7.22 Symmetrical triangle in the downtrend (continuation pattern) (Chart sourced from and © FutureSource UK Inc)

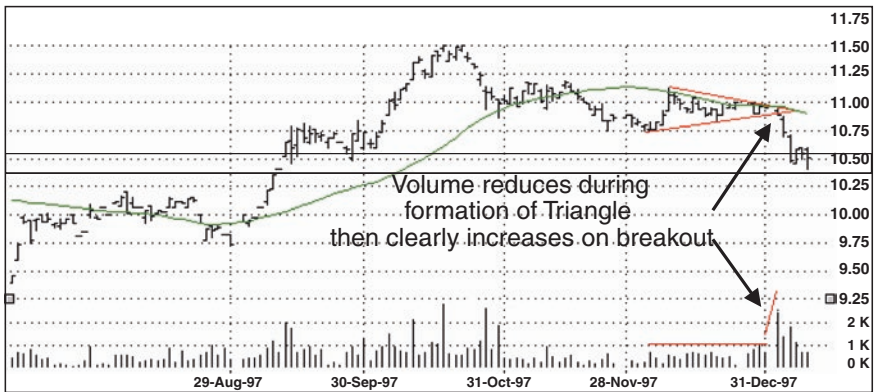


Fig. 7.23 Symmetrical triangle at the beginning of a downtrend (continuation pattern) (Chart sourced from and © FutureSource UK Inc)

of timing when a breakout will occur and also an idea of the direction of that breakout.

A symmetrical triangle at the beginning of an uptrend (continuation pattern) This signals that a bigger uptrend is still to come. Notice the reduction in volume during the formation of the triangle and the sudden burst of volume trading activity on the breakout (Fig. 7.20).



Fig. 7.24 Ascending triangle in an uptrend (bullish continuation pattern) (Chart sourced from and © FutureSource UK Inc)

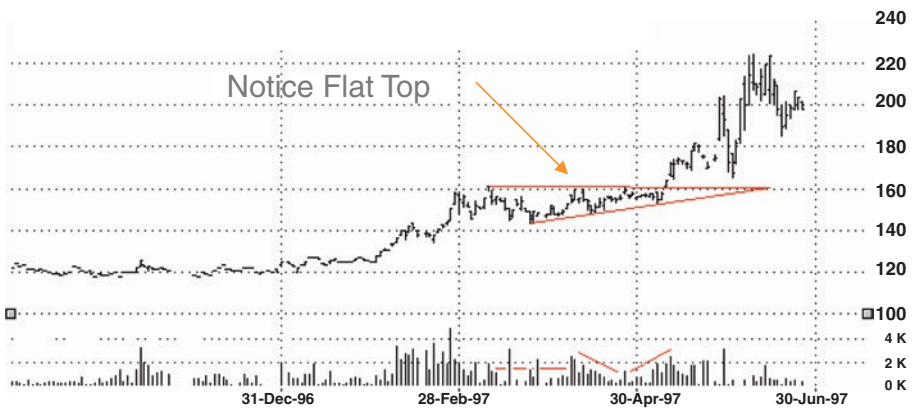


Fig. 7.25 Ascending triangle in an uptrend (bullish continuation pattern): flat top (Chart sourced from and © FutureSource UK Inc)

A symmetrical triangle in the middle of an uptrend (continuation pattern) This signals a bigger uptrend still to come (continuation pattern). Notice the leveling of the volume during the formation of the triangle and the burst of activity on the breakout (Fig. 7.21).

All triangle formations not only give us an indication of a continuing trend but also an indication of a price target (Figs. 7.22 and 7.23).

An ascending triangle in an uptrend (bullish continuation pattern) Volume falls off during the formation, picks up and then expands on the breakout and following upmove (Figs. 7.24 and 7.25).

Summary

There are a large number of tools that can be used for technical analysis of the market and it is important that they be used in combination with each other. But even if the five or six most appropriate analytical tools have been chosen to study the prevailing conditions, the results may still not always prove utterly reliable. The truth is that in the real world there are some days when technical factors drive the market and others when it is driven by fundamentals.

The key is to identify and keep asking the same questions over and over again: what is driving the market: technical factors or fundamentals?

Is there any fundamental news which has not yet been absorbed by the market price or, in turn, by the technical analysis? Successful traders know that important fresh news will always be in the price before it turns up in the charts.

8

Building a Disciplined Trading Approach

Being a Professional Trader

The mastery of trading is a never-ending pursuit. Knowledge of and confidence in a workable methodology is just a departure point. Consistency in the approach and application of a particular technique will be the real key to a trader's success. So, though initial market and trading theory is important, it is not until a trader attempts to put actual technique into actual practice that the real learning begins. All methods begin with the laying down of structure and rules—however, these are ultimately meant to serve as guidelines. A newer trader will do best to follow these guidelines as closely as possible and, in doing so, should meet with a modicum of success. As a trader develops more expertise, he or she will be better able to recognize when certain market conditions are changing and when “rules” can be given more flexibility. If a trader's bottom line starts to suffer, though, he or she would do best to go back and follow the guidelines and rules as much as possible. Self-study is just as important to successful trading as is the study of price behaviour or technical analysis. Traders must maintain an even temperament, an orderly composure, and a calm mind. They must have the confidence to believe in their own trading decisions without looking to outside sources for validation or confirmation. Dedication, persistence, and patience are required for success and, ultimately, mastery.

Doing your own analysis, study, and research is the fastest way to build confidence in a trading process. Experience is applying the trading process in a consistent fashion until it becomes ingrained in your trading personal-

ity and is part of your routine. Understanding the next most “probable play” needs to become second nature. The ability then to act on this information is the goal. Cumulative successful results are achieved by following this process on a daily basis. As with any performance-oriented discipline, you must enjoy the day to day process that makes up the journey if you are to be successful.

The markets are a personal journey and every trader is destined to learn market truths for themselves. The learning curve is as much about figuring out what doesn't work as it is discovering which things work best for you.

Each individual has a different personality and thus a slightly different approach to the market. However, a trader is less apt to experience a setback if he or she accepts some basic fundamental truths as to the nature of the game. First, though principles of price behaviour remain the same, the game is always changing in subtle ways. Relationships that we take for granted can change. New technology has speeded up information flows and changed the execution process. New market products continue to be created. So, it is important to maintain an open mind to the fact that there are a myriad of possibilities that we may not be able to see at the time.

Second, the key to longevity in this business is first and foremost capital preservation. Have the patience to wait for clear, well-defined trade setups. The majority of trades result in small wins and small losses. Stay in the game until the deck is loaded, and then strike when the iron is hot. Unfortunately, these times don't come around as often as we would like. There is never much advance notice when the markets are going to get hot. Thus, be prepared to trade every day and, when the action is good, do not take it for granted that it is going to continue to be good.

Third, a large percentage of trading profits will come from a small percentage of the trades. A trader can't predict in advance that the market is ready to give a better than expected gain.

More often than not, a consistent increase in the bottom line comes from a combination of two factors: numerous small winning trades, and not letting any single loss get too large. This is the area of money management. In theory even if the majority of your trades are losses, as long as they are controlled and your profitable trades are much larger, you are still net profitable.

The majority of professional traders nickel-and-dime the market week in and week out and make a consistent living in the process. Still, the trader is always staying alert yet patient, waiting for the market to give that one opening where a larger gain can be made. Much of trading is learning how not to beat yourself up.

The vast majority of commodity traders know when they're making mistakes. In this respect, they beat themselves. The best defence against making trades in an emotional state, such as frustration or boredom, is to be prepared and have a game plan. You must be in a prepared state *before* the market opens, and then, by being patient, calm, cool, and collected, you will be better able to capitalize on the choicer opportunities when the market tips its hand.

As a trading director I once had a trader working with me who phoned me up in the office and apologized that he would not be coming into the office that day and asked for my understanding. He sounded really serious on the telephone and I was worried. I asked him, "Is everything OK at home?" He answered that his family was fine, just that when he left his home that day he forgot his keys and went back to get them. But as he did so he remembered that the last time he did this he lost money in the market. Psychologically he was now not in a good state of mind to take on the markets. My advice to investors and traders is to get a good night's sleep, exercise, be happy, and be in a good zone and frame of mind, otherwise maybe give the market a rest that day.

Successful trading is about minimizing mistakes or "unforced errors", to use a sports analogy. It's not about brilliant analysis or out-smarting the market. It's about perseverance, consistency, and confidence. Professionals can and do occasionally make big mistakes. But the ability to get right back in the game and fight to make back losses is what makes them a professional. The ability to get back on track and start following a well thought out trading programme keeps them playing the game. They don't quit because they are determined to succeed.

In order to be profitable, you must learn how to win the real game: the mental side of the business. This includes recognizing the importance of having a game plan, the incredible role that patience plays (waiting for conditions to be just right before entering a trade), and the tremendous amount of mental strength it takes to endure the slow times.

Don't try to outsmart the market. Analysing and predicting the markets is not nearly as important as learning how to react to what the market actually does. Stay involved in the process of making the right decisions at each moment, and let go of worrying about the outcome. Take each trade one at a time and manage it to the best of your ability at that moment. Trust your judgement. Hard work is required to win. It is hard work preparing your game plan each and every day and putting in the necessary time to study the market's actions.

Determine the overall market environment and whether it favours your play. Then make your forecasts based on the current price swings, not on what you think the market ought to do. It is hard work to stay focused and push aside all the distractions that try to come between you and success. Concentration, routine, and ritual are the most powerful tools at your disposal to help ward off distractions and eliminate the emotions and anxieties that hinder good performance. To win and win consistently is hard work. Otherwise, everyone would be a winner in the markets and that's obviously not the case.

The nature of the game is to understand the constant changing nature of market relationships. There are numerous aberrations and "outlier" events (abnormal behaviour) that create both opportunity and risk. Though it is important to follow a trading process in a consistent manner, there is no guarantee of consistent profits. The professional knows that just two or three good months can make his or her whole year. It takes a lot of patience to step back and view one's business with such a long-term perspective. It takes a lot of tolerance to accept the fact that our timing will never be perfect, and that we'll always leave profits on the table. We'll miss dozens of "big ones". For the great trades that we do catch, we are often never as heavily committed in terms of size as we would like.

Trading is the ultimate lesson in attitude. Every day we can choose to criticize all the things we didn't do right, or we can marvel at the abundance of opportunity the market provides for us. We can accept our losses as necessary lessons and steps to future successes or we can blame a myriad of external causes for those failures and become discouraged.

Ultimately, the best traders don't try to figure out all of the market's peculiarities. They follow their methodology and find great mental freedom in following their rules and structure. They've created their own playing board, their own mental market world. They are absorbed in it and find pleasure in marvelling at all the subtle nuances they have discovered.

Trading with the Edge

Successful traders who have demonstrated longevity in this business have one thing in common: a consistent methodology with a demonstrable edge. You cannot trade profitably over the long run without an edge. What is your "edge"? How are you going to have an advantage over everyone else? Your edge will come from following a methodology that has a proven, quantifiable, positive expectation. Your edge will come from recognizing the type of market environment that favours your particular methodology. Your edge

also comes from avoiding certain market environments that you know are not suitable to your trading style or skills. You must know what works and what doesn't work for you. Your edge is in your ability to admit quickly when you are wrong and revise your game plan. You may also have an individual edge such as having fast reflexes, exceptional execution skills, or perhaps an ability to recognize and react right away to a trade that isn't working. You must *keep* your edge and be prepared in all ways for each trading day. Lastly, you must *believe* that you have an edge. This belief comes from doing your own research and preparation. It is this belief that will motivate you to achieve superior performance.

There is no such thing as a wrong methodology if it can be proven to have an edge over time. Many successful traders employ many different styles of trading, execution, and money management. The ideas presented in this book are 100 % technical. It is a basic tenet of technical analysis that the most important fundamentals have already been discounted in the market's price. Fundamentals may affect the longer-term trend. However, a professional trader is concerned with capitalizing on the short and intermediate price swings, and these are often caused by human emotions, such as fear and greed, in addition to fluctuations in supply/demand.

Once you can apply a trading process consistently, your profitability will all come down to simply executing trades. You won't make money if you don't pull the trigger. Confidence is what will keep you consistently placing the proper trades on a regular basis. Confidence comes from doing your own research, staying involved in the process, and taking each moment one at a time, observing a pattern repeat itself numerous times, and gaining experience in execution and organizational skills.

If you pick one style and stick with it, you will not only gain confidence in that style, but you will begin to learn its subtle nuances (giving you a further edge). If you continually trade with an edge, you will make money. Stick with one methodology and take all the trades.

To summarize the key points:

- develop a consistent framework for following the market's action;
- develop your own process (routines, rituals, research) to take advantage of the price action within this framework;
- believe in your process;
- trades made must come from this process, rather than "randomly";
- stay involved in the process and emotionally detached from the outcome.

Principles of Price Behaviour

There are four basic principles of price behaviour which have held up over time. Confidence that a type of price action is a true principle is what allows a trader to develop a systematic approach. The following four principles can be modelled and quantified and hold true for all time frames, all markets. The majority of patterns or systems that have a demonstrable edge are based on one of these four enduring principles of price behaviour. Charles Dow was one of the first to touch on them in his writings.

Principle 1: a trend has a higher probability of continuation than reversal This is one of the basic tenets of Dow theory. An up-trend is defined as *both* a higher high and a higher low, and vice versa for a down-trend. For example, in order to reverse from an up-trend to a down-trend, the market must make a lower low and a lower high and then turn *down* from there. If the market is in a well-defined trend, the largest price swings tend to occur in the direction of the trend. When the price is moving in a clearly defined trend, there are numerous strategies for entry based on the small retracements that occur along the way. These reactions allow the trader to find a tight risk point while still playing for a new leg in the direction of the trend. Here are a few notes on trends:

- Once a trend is established, it takes considerable power and time to turn it.
- A major trend seldom reverses without warning, such as a pronounced loss of momentum followed by a period of accumulation or distribution, or a buying or selling climax.
- In strong trends, reactions become shallower as the trend progresses.
- The absence of any pattern or swing in the price implies a continuation of the prevailing trend. The strongest trending action tends to be accompanied by a decrease in volatility. This could be described as a methodical eating away of overhead supply, or a slow, steady price deterioration in the case of a down-trend.
- Trends tend to begin after the market has wound down to an equilibrium level. Just as volatility collapses in the middle part of a trend, price action can become more parabolic in the later stages of a trend. In some extreme cases, 75 % of the gains can come in the last 20 % of the trade.

Principle 2: momentum precedes price If momentum makes a new high or low, the price high or low is most likely yet to come. Momentum is one of the few “leading” indicators. Elliot used the term “impulse” to refer to an increase in

the market's momentum. Impulse indicates imbalance in the supply/demand equation and most often occurs in the direction of the prevailing trend. A trader should look to enter in the direction of the market's initial impulse. New momentum highs can be made in both a trending environment, or on a breakout of a trading range. New momentum highs or lows should correspond with a new price high or low as well.

Momentum can be defined using a number of different types of calculations or oscillators. A simple rate of change, such as a two or ten-period rate of change is a momentum indicator. Moving average oscillators or an RSI will make new highs or lows when momentum makes new highs or lows. Range is highly correlated with momentum. New highs or lows in a momentum oscillator accompanied by range expansion also confirm new momentum highs or lows. An increase in range is a sign of "impulse".

A trader should look to establish new positions in the market on the first reaction following a new momentum high or low. The only exception to this rule is after a market makes a buying or selling climax. This is not a new momentum high or low, but an exhaustion point that creates a vacuum in the opposite direction.

A trader can enter a trade "at the market" when new momentum highs or lows are made following a breakout from a trading range. In an already established trend, a mild pullback or consolidation will be more likely than new momentum highs or lows following a breakout.

Principle 3: trends end in a climax A trend will continue until it reaches a "buying or selling climax". This tends to be marked by an increase in volatility and volume. Ideally, there should also be a marked increase in the range. A buying or selling climax indicates that the last buyer or seller has been satisfied. The market then usually begins a process of backing and filling, testing and retracing, and in some cases has a greater reaction in the opposite direction.

Trends tend to go further than we think they will, and often the price "overshoots" on the extremes. Price is at a new level and nobody has had a chance to get comfortable with the new levels. The market will tend to begin a testing process in both directions until it reaches a new equilibrium level. It is rare that a market immediately begins a sustained down-trend after it has been in an up-trend. Thus, a trader should be prepared to trade in both directions for a while after a trend has ended and not be too eager to set positions in the opposite direction. The process of consolidating back to a new equilibrium point can be a long and drawn out process.

There is a smaller percentage of times where a market makes a “V” spike reversal following a buying or selling climax. This is the most powerful pattern in technical analysis as it creates a vacuum on the other side. In these situations, the market sharply reverses its direction without the normal consolidation period. This type of pattern does not happen very often, but has powerful forecasting implications when it does.

Principle 4: the market alternates between range expansion and range contraction Price action tends to alternate between two different states. The market is either in a trading range environment trying to wind back down to an equilibrium level, or it is expanding in range with impulse, indicating a persistence supply/demand imbalance. This mark up or mark down phase persists until it reaches a new level. Once a new level is reached, the testing process will begin all over again as the market winds back down to an equilibrium level. And, once again, when a market has narrowed in range and found an equilibrium level, it is difficult to predict the direction of a breakout. On occasion, the market will move first in one direction and then move sharply in the opposite direction. Volume is a useful confirmation that the range expansion is for real.

Cardinal Mistakes in Trading

Self-discipline It has been my experience in trading commodities that the greatest cause of loss is lack of self-discipline, of following your game plan; a lack of self-discipline to be patient; a lack of self-discipline to take a loss or profit; a lack of self-discipline to follow proven money management concepts. The list could go on and on.

Fear and greed With the tremendous leverage commodities offer, you as a commodity trader are frequently exposed to the basic emotions of fear and greed. At certain times in your trading career these emotions can make you completely and absolutely irrational, oblivious to what is *really* happening. It can make you rely on *hope*.

Danger of success Each time I made one of these cardinal mistakes, I promised myself that I would not repeat the same mistake; but when I became once again

successful, as I made money, I invariably became overconfident, sloppy, and “dangerous”. You are most likely to make these same mistakes when you are making money, not losing it. After several losses, you naturally tighten your discipline and become more conservative, or lose all of your risk capital. Following several losses you are likely to lose the least amount of money on a trade.

Overconfidence It is when following a string of profitable trades that you are most likely to lose large amounts of money. If you began trading with \$30,000 and limited yourself to a 10 % risk, you could lose a maximum of \$3000 per trade. With profits increasing your account to \$100,000, you can now lose \$10,000 per trade. Worse yet, flushed with success, you are more prone to break your rules and “wait a day”, when you should have been stopped out. Reviewing my records, I found that some of my *largest losses* have come from my *smallest positions*. After making large profits, I let these small positions run into extremely large losses because I was *overconfident*.

Balance Trading commodities is a game of psychology. It is a game of balance. Emotional extremes create an *imbalance*. In your elation at being successful, you will make mistakes of greed. In your reluctance to take a loss, you will make mistakes of fear. The tremendous emotional release I have felt when I finally closed out a big losing position was amazing. Fighting the market, yet knowing it was going to go against me, but wanting it to go in my direction—pushing it, *hoping* for it, worrying about it. After a few days or a few weeks of that, it felt as though the weight of the world had been taken off my shoulders when I finally took the loss.

Hope One of the early signs that you have made a serious mistake is when you change your routine and begin to call your broker frequently for quotes and “reasons” for the market to go your way: things such as asking him to call the floor for advice, asking your broker what he thinks you should do (even though he told you 15 minutes earlier), *hoping* that some government action will bail you out. This is not commodity trading; it is hope. Hope is the most devastating of all emotions in trading commodities because it can lull you into complacency. You know when you find yourself *hoping*, that you are wrong, and should immediately get out of the market, but it takes an unusual amount of self-discipline to take that very large loss.

Take profits Tremendous amounts of money can and are being made in the commodities markets. Profits are there for the making, but the real key to trading commodities is not making money: *it is keeping it*. It is not basking in the elation of success; it is taking your profits and looking over your shoulder.

Profit/loss cycle Every experienced commodity trader has a profit/loss cycle. I know mine, and most other professionals know theirs. Without exception every futures trader I know experiences a cycle of success, of over-commitment, of over-confidence, followed by losses and a feeling of failure. These cardinal mistakes can be overcome through strict, unbending self-discipline, and mechanical rules that cannot be broken.

Once aware of these mistakes, by following the rules and guidelines outlined in this book, your odds of making money will be greatly increased.

Lack of Game Plan One of the most important moves a futures trader can make is to develop a game plan consisting of these basic guidelines:

- know how and where you are going to enter a market;
- know how much money you are going to risk on each and every trade;
- know how and where you are going to get out if you are wrong;
- know how and where you are going to take profits if you are right;
- know how much money you are going to make if you are right;
- have a “safety stop” a stop loss, in case the market does the unexpected;
- have an approximate idea of when a market should meet your objectives, when it should begin to make a move, and if it has not done so, get out!

Lack of money management Money management is controlling your risk through the use of stops, while balancing your potential for loss against your potential for profit. Many commodity traders refer to a trade that might lose them \$500 if they are wrong and make them \$1500 if they are right as a three-to-one risk/reward ratio—a “decent” trade. Yet, that is wrong because the most important aspect of a trade is not how much you are going to lose if you are wrong, or how much you are going to make if you are right, but what the odds are of making money, of being right. What are your odds of losing money, of being wrong? Good money management means you know your profit objective and the odds of being right or wrong, and control your risk with stops. You are better off with a trade where you might lose \$1000 if you

are wrong, or make \$1000 if you are right, that would work eight times out of ten, than to take a trade where you would make \$1500 if you are right and lose only \$500 if you are wrong, but which works only one time out of three.

Failure to use protective stop loss orders This fits right in with a game plan and money management. It is the failure to use stop/loss orders once you enter a market—not *mental* stops, but *real* stops that cannot be removed. All too often commodity traders use mental stops because in the past they have been stopped out and then watched the market move in their direction. This does not invalidate the use of stops, it means their stop was in the wrong place—they did not have a good technical stop. When a stop/loss order that was determined before you entered the market is hit, it means your analysis was wrong, your game plan was wrong. With a mental stop, as soon as the market has gone through your stop price, you no longer act like a rational human being. You are more likely to make mistakes because you are now operating on fear and hope. How many times have you had a mental stop and instructed your broker to call you when the price goes through it? By the time he could call you, the market had run an extra \$500 against you. You invariably decide to hold onto the trade hoping that you can get out on a retracement to your previous stop price. Unfortunately, it never touches that price again and you take a large loss. Or you make the mistake of holding the trade overnight because you hoped it would go higher the next day. But the next day it is lower yet, and by then your loss is so large you can't "afford" to get out—and what should have been a small loss turned into a disaster.

There is an old saying that the first loss is the smallest. It is also the easiest to take, even though it may seem hard at the time. *The only way to overcome this mistake is to have an unbreakable rule (and the discipline to follow it) that stop/loss orders must be placed each and every time the market is entered.* The easiest way to take a loss is to have the stop order waiting before the open or immediately after entering the market. Do your homework when the market is closed, and place your order before the open. Another rule to follow is that under no circumstances should an initial protective stop/loss order be changed to increase your risk, only to reduce it.

Taking small profits and letting your losses run A very common mistake among futures traders is taking small profits and letting losses run. This is often the result of no game plan. After one or two losing trades, you are very likely to take a small profit on the next trade even though that trade could have turned

into a large profit-maker that would offset all your losses. Letting your losses run often happens to new futures traders and is not uncommon among older traders. After entering a market, you don't know where to get out. Once you start losing money your tendency is to let your loss get larger and larger as you hope the market will let you break even—which of course it seldom does. *This mistake is overcome by using predetermined stop/loss orders to prevent your losses from running, and following your game plan to take profits at your profit objective.*

Overstaying your position One of the most common mistakes of trading futures is overstaying your position, or simply failing to take profits at a predetermined level. There seems to be a natural law that the market is only going to allow one individual so much money before it starts to take it back. Yet, it is when you have these profits, especially paper profits in your account, that you often try to get the last nickel out of the trade. If the market meets your price objective and you are still in the market without a close stop/loss order, you are overstaying your position. All too often the market breaks sharply through your “mental stop” and from that price level and you watch your paper profits disappear before your eyes. Then you decide to hold on for a small rally, and the market never rallies enough. It drops back to break-even, and now you *really* begin hoping. Next thing you know you have a loss. Be aware that a large profit can turn into an even larger loss.

This mistake can be overcome by the use of trailing stops raised closer to the market as your price objective is approached, or automatically taking profits at your price objectives.

Averaging a loss This is usually a holdover from trading commodities. In futures, with a 5 or 10 % margin, averaging a loss can be disastrous to say the least. A typical approach is that, after you have bought a future and it drops lower, you might figure that, since it was a good buy then, it is a better buy now. You can also justify averaging down by figuring you will have a lower average entry price and require a smaller move to break even. Unfortunately, you will lose twice as much if the market continues against you, as it almost always does. There are approaches that will allow you to buy a market at one price level, add on at a lower level, and add on again at even a lower level, as long as this was your predetermined game plan *before* you bought the first contract. You must also have an unmovable stop/loss order that takes you out of all contracts. *This mistake is easily overcome by having a strict rule that*

you never average a loss unless your predetermined game plan called for buying the market at lower levels with an unmovable stop/loss order to take you out of all contracts if it is hit.

Meeting margin calls Most often, meeting a margin call will only increase your loss. A margin call means you are wrong in the market and your position should be closed out. Margin calls are met because people do not want to admit being wrong and take a loss; because they hope the market will eventually go in their direction. Margin calls are the result of making one or more of the mistakes such as not having a game plan, not using stop/loss orders, overtrading, or poor money management.

Increasing your commitment with success One of the most dangerous mistakes you can make in trading commodities is to increase your exposure as you become more successful. Just by being successful you will risk more dollars per trade because you have more money. But, because you have more money (and confidence) when successful, you are also likely to take larger percentage risks. Not surprisingly, this ruins more futures traders than a series of small losses. *You can overcome this mistake by not allowing your percentage commitment to increase as you realize profits and by maintaining your stop/loss discipline.*

Overtrading your account Or risking too large a percentage of equity on any single trade, either with too large a dollar risk per contract, or by trading too many contracts for any single trade, or by trading too many commodities. This also happens after a period of success when you “know” that the market is going to do something. You are so certain that this is going to be a really big move that you risk much more than the maximum 10 % of your equity. Already emotionally out of balance, all it takes is a couple of limit moves against you and you are bust. *To prevent this mistake from occurring, you must have a hard and fast rule that you can risk no more than a certain percentage of your equity on any trade regardless of how good the trade looks.*

Failure to remove profits from your account It is almost a natural law that the commodities markets over a given period of time will allow you to make only so much money and then you are going to have to start giving some back. Yet, probably no more than 1 % of all commodities traders I know have a rule to

take profits out of their account. (However, they never fail to put money into their accounts as they meet margin calls.) Almost always, they leave profits in their accounts and go for the “big trade”—the one that will give them a real “killing”—which usually kills their profits. *This can be overcome by predetermining an equity level at which you remove profits from your account. When you make profits in the commodities markets, take some money out and put it somewhere else.* The commodities markets are not a cornucopia. You, as all commodity traders, will move in cycles. You will make some, lose some, make some, lose some. By taking money out of your account when you are profitable, you will not make the mistake of losing larger amounts of money when your down cycle begins.

Changing your strategy during market hours During market hours you are subject to emotional reactions of fear and greed much more than you are when the market is closed. Have you ever noticed that when you sit down in the quiet of the night before the trading day you can very calmly figure out what you want to do the next day; yet, shortly after the market opens you do exactly the opposite of what you had planned. With rare exception, the best approach is not to change your trading strategy during market hours *unless* there is an unexpected news event or market reaction. *Overcome this mistake by developing your trading strategy before the market opens and by having the discipline not to change your game plan during the day.*

Lack of patience Or trading for the excitement, not the profit. The average life of a commodity trader is somewhere between five minutes and nine months. Not all commodity traders trade because they want to make money. Many trade because they want the action. Think about it: must you have a trade a day, or can you patiently wait for the high probability trades, even if it means standing aside for a week or two? For those of you who wish to learn how to make money in the commodities markets, rest assured you can. However, do not expect to make money in each and every trade. If you concentrate on not breaking the cardinal mistakes of commodities trading, you have a greater probability of making money over a period of time. Certainly you will have losing trades. Certainly the market will do the unexpected, and at times you will lose more than you expected. But if you steadfastly avoid making these mistakes you must make money. By studying the past history of a market you can isolate high probability trades and situations that offer exceptionally large profits relative to the dollar risk.

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Trade Like a Professional

Trade Management and Exiting a Position

Some of the most profitable traders I know are some of the worst traders I know. But for what they lack in getting the market right, they excel in their trade management. Their trade management is what I term active management. Always monitor the market for new information. Always be looking for signs of strength and weakness. Exit immediately on any adverse development. Exit a trade if it is not profitable within a certain amount of time. Good trades move in your favour right away. *Time* is a function that can kill a positive expectation. If you *add* to a position, you must move your stop up to the average point of entry. When in doubt, reduce the position size.

Day-traders must become trading masters by taking quick losses. You must learn to recognize as quickly as possible when you are in error. You will ultimately, from my experience, make the most money (through loss savings) by recognizing you are wrong quickly. You must be on the lookout for a sign that you are wrong. The minute you realize that you are wrong in a trade, take action to get out. Place an order immediately. It does not have to be a market order but start to use a pivot or use a market bracketing strategy. You must also recognize when you are in a good trade.

The biggest mistake I have seen being made, even made it myself, is closing a profitable trade without good reason. Always follow good trades up with a protective stop order to protect your profits.

I always wondered how traders who were really great at technical analysis could be really bad traders sometimes. Then I saw that you need a good balance between strong analysis skills plus money management skills.

If you are in a losing position, throw the technical indicators out of the window. Technical analysis only forecasts probabilities. You can't afford to deal with probabilities when you are in a losing trade. So use technical analysis to look for market opportunities, but if they prove wrong revert to protective money management approaches. The first important rule is to exit a bad position as soon as possible.

Stops

To remove some of the mixed emotions that are naturally human for us to feel, we can utilize various approaches to take us out of bad trades automatically. Fixed money management stops have no relationship to market activity. But they are necessary. The advantage of a fixed money management stop is that its relationship to price action is random. It is unlikely to be placed around a cluster of stops or significant chart point. Stops fall into two camps. The first type is the worst case scenario. This means that you want to use as wide a fixed money management stop as possible. The market has to be able to move in quite a broad range without hitting your stop. The second type of stop is a technical one. It is placed where the market shouldn't go. In other words, at the point where your original analysis would be proven wrong.

Money management decisions should be automatic and mechanical. Don't subject yourself to making risk judgements when under pressure. A person performs differently when under pressure. It is amazing how having a resting stop in the market can reduce the pressure you experience: it relieves the anxiety and you do not feel compelled to watch every tick. At this point I would mention the old saying: "Never get married to your position." Many times I have witnessed traders get married to their positions, mainly their losing positions. You can become totally obsessed and focused on managing your losing position that you miss the hundreds of other great winning trades that the market presented during the day. Having a game plan from the beginning with a stop loss strategy will remove that and allow you to get on and look out for other opportunities and let the market play out with the trade you have just executed.

I have found that the majority of the time when I have been stopped out, I am able to re-enter at a better price if I still like the trade. When I don't use

a stop, I find I let the losses run a bit deeper than originally intended—me versus the market. Recognition and self-reflection on our own biases in dealing with the market is part of the whole professional trader development process. None of us are perfect, but what makes a professional trader stand out is the one who recognizes and accepts his or her own trading preferences to buy/sell, and risk/reward biases, and who then builds disciplined approaches via technical analysis and money management to protect themselves from themselves.

Money Management: Risk Reward

Traders differ in their appetite for risk. Many times, the greater the risk point, the better the trade. This statement is made in the context of volatility. An active, swinging market has more to offer than a quiet market. Usually, the stops will be placed further away than they would be in a quiet market. Always assume risk if there is a positive expectation involved.

There are more “outlier” events, or price aberrations, than most traders and most mechanical systems take into account, especially in the commodity markets due to the complex dynamics involving the moving of physical assets around the world, geopolitics, and weather. These unexpected, unpredictable events are what make up a large portion of market risk. Much risk-taking rests on opportunities that develop from deviations from the norm or market inefficiencies. Risk can be controlled by the amount of time spent in the market place. The shorter the time spent in the market, the less the risk. Try to maximize the areas where you have control over risk and minimize the areas where you don't. We can control leverage, time exposure, and fixed stops. We cannot control factors such as volatility, overnight events, liquidity factors, and execution risk.

One of the keys to good money management is the degree of leverage used. The majority of “big problems” come from using too much leverage. Risk management also encompasses watching the degree of correlation between positions.

When managing your trades, a good rule is to take half off and “push” the other half. Always think about putting yourself in a win-win situation. A stronger case can be made for scaling out of positions for trades made on a longer time frame. For short-term scalps, it is always best to exit the whole position at one time as opposed to trying to scale out.

Account Management

Trade your equity curve; manage your position size. No single trade is ever important. Mark to market every day and keep losses in perspective. Remember, in account management, you cannot afford to play around with probabilities. You must have hard and fast rules to protect your capital. Have a firm threshold level in your mind that you protect against for your account. If your account equity approaches this level, cut and run. Close the account down and then build it back up to this level. Better to lose \$1000 per contract than \$2000. Better to lose \$10,000 than \$30,000.

Write, Trade, Plan

Even many professional traders still write out a trade plan on a piece of paper or in a note pad. Do you have a trade plan? Have you written down goals? The first thing you need in your trade plan is a detailed outline of your trading programme. But this is just a small component of your overall business plan. It must also include everything from how you structure your trading environment to how you structure your life.

Your mind and psychology are your main trading assets. How do you plan to protect them? Many traders have sabotaged their account when they have a momentary relapse and go over the deep end. A trader can be his own worst enemy. Anxiety and stress are the two biggest factors that can derail a trader. How have you structured your daily habits, your personal relationships, and your financial planning to protect yourself from these?

Your trading plan should be structured to motivate you to make higher highs in your account equity. This sounds like a given, but you must truly fight to come back from each draw down. You must have allowances in your plan not to give back more than a minimal percentage of profits. You must always know what your “high water” mark is. This high point is always your next goal.

Emotional decisions are the most destructive factor to the bottom line. Your trading plan is your protection to guard against these. On a daily basis you have your trading execution plan, what you think about the market, and what is going to be your approach.

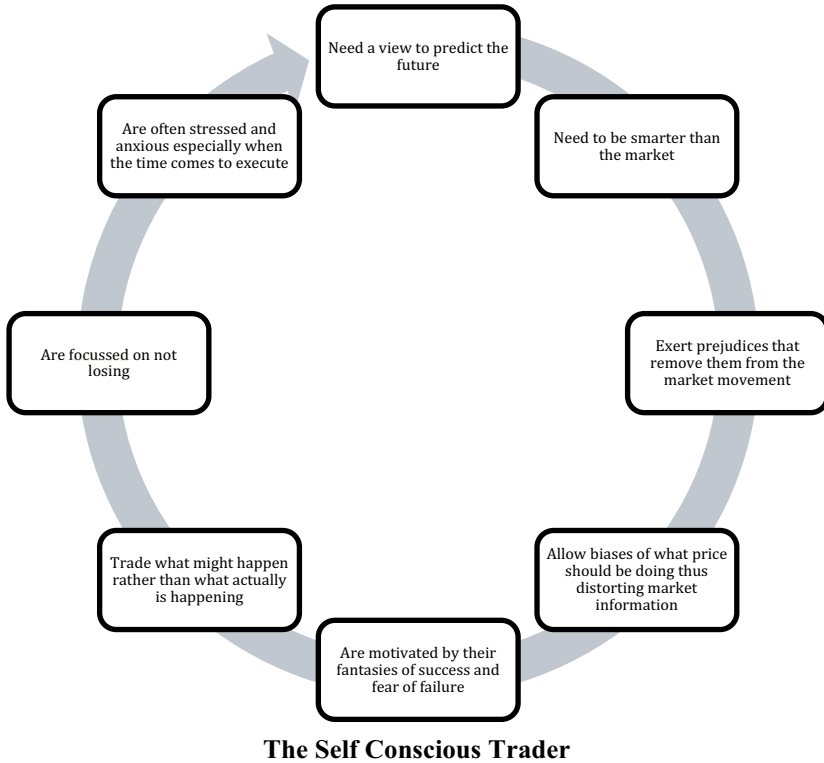


Fig. 9.1 The self-conscious trader: own composition

Don't Trade Yourself, Trade the Market

The transition to professional trader status requires a change from self-conscious thoughts and behaviours to market-conscious thoughts and actions (Fig. 9.1). Basically, self-conscious traders trade themselves and not the market (Fig. 9.2).

A market-conscious trader, however, certainly being cool, calm, and in the “zone” as you might call it, is a necessary condition for success. But it is not enough on its own. For consistent success a trader needs a consistent market-conscious strategy that is executed without inhibition, and this is where technical analysis, can be useful to help build disciplined approaches towards the market which removes the human emotions that can sometimes start to take over if we are under pressure. Some key points for successful market-conscious trading are:

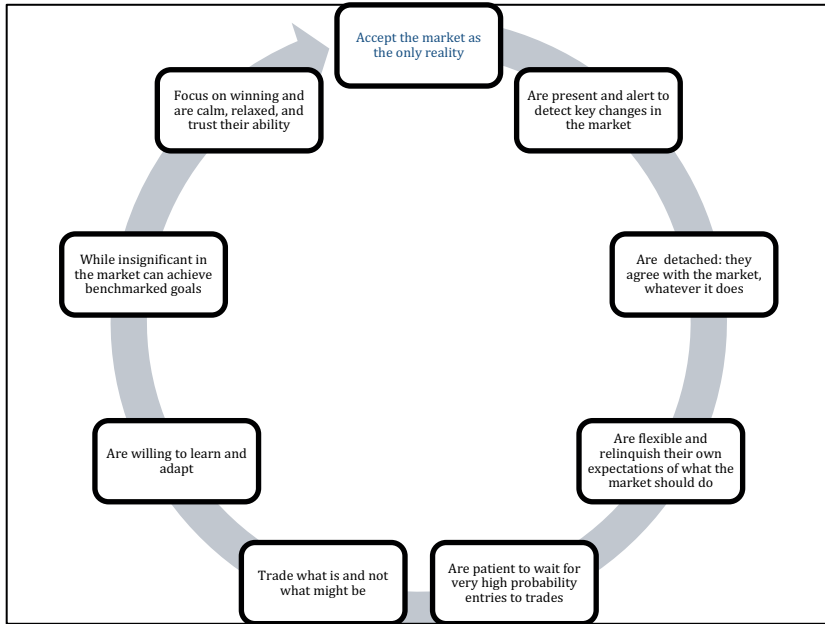


Fig. 9.2 The market-conscious trader: own composition

- identify points at which risk is worth taking (unfortunately most of us try to analyse risk in the trade);
- remember that in the risk/reward relationship, the higher risk equals the higher potential reward;
- look for quality trade opportunities in the current trend and volatility conditions that will give the biggest bang for our buck;
- do not look for certainty, instead observe those conditions that when traded upon can create a return that covers losing trades as well as making the business worthwhile.

Have your individual trading plan:

- Remove the emotional factor: be cool!
- Have target profit areas: many traders I have trained and who were fantastic at spotting market and trading opportunities, just didn't know when to take some profit. A lot of training focuses on protection and risk management, but we also need to consider our profit targets, perhaps by setting a profit stop on 50 % of our positions and letting the rest run in case the market does go beyond our expectations.

Table 9.1 Number of trades going wrong versus capital left, based on 2 %, 5 %, 10 %, and 20 % capital stop loss on each trade

Risk	2 %	5 %	10 %	20 %
Capital	10,000	10,000	10,000	10,000
1	9800	9500	9000	8000
2	9604	9025	81,000	6400
3	9412	8574	7290	5120
4	9224	8145	6561	4096
5	9039	7738	5905	3277
6	8858	7351	5314	2621
7	8681	6983	4783	
8	8508	6634	4305	
9	8337	5302	3874	
10	8171	5987	3487	
11	8007	5688		
12	7847	5404		
13	7690	5133		
14	7536	4877		
15	7386	4633		
16	7238	4401		
17	7093			
18	6951			
19	6812			
20	6676			
21	6543			
22	6412			
23	6283			
24	6158			
25	6035			
26	5914			
27	5796			
28	5680			
29	5566			
30	5455			
31	5346			
32	5239			
33	5134			
34	5031			
35	4931			

- Have target stop loss protection levels, which should match your risk/reward appetite.

I hear you saying, “OK, yes our risk reward must match. But how much risk can I take on my trades?” Well, let’s put things into perspective (see Table 9.1).

Quite a difference is made by having only half of your capital left after 13 trades if you risked 5 % of your capital as a financial stop loss, versus only 2 % and 34 consecutive losing trades halving your capital.

Record Keeping: Adding Structure to the Plan

Write down your daily game plan. Do not put yourself in a position where you are reacting to the market's movement. You want to be prepared to take advantage of the movement. The process of writing things down can be critical to your success as a trader. Keep a daily trading worksheet. Write down orders or trades for the next day. List any open positions and stop levels. Keep a record of your ticket numbers. It will allow you to reflect and learn what works and what trading behaviour you may exhibit that does not work. Log your trades at the end of the day. This is a discipline. It finishes off the day with a routine. Remember that routines free our mind from self-talk and give the day some type of closure.

Know where your account is at all times. Are you plus or minus on the day? How are you on the month? Recap your trades at the end of the day. Treat the markets like a business. Have routines at the end of the day to update your charts or crunch your daily numbers.

Managing Your Trading

The following points are more important than any method, technique, or system I could ever show you. If you are not in a proper frame of mind, don't trade. If you do not feel prepared for any reason, don't trade. How many millions of dollars have been needlessly lost because a trader is moving, having personal problems, or having health problems? You are not going to perform in the market if you are not prepared to concentrate 100 %.

Guard against burnout. When you are burned out, you must close out your trading positions. Your judgement will become impaired and you risk losing your self-confidence. Step back, and regain your perspective and focus.

Keep your emotions in check. Try to stay on an even keel after both losing streaks and big winning trades. Your emotions need to stay steady regardless of what your equity curve is doing. Concentrate on playing a steady game. Do not think about profits, they will build up by themselves if you are trading well.

Rely on yourself. Do not seek out other people's opinions or advice. Learn to think and trade independently. After a long period of success or a string of profitable trades, decrease your trading activity and take a rest. It is natural for a trader to get complacent or over-confident after a good winning streak. One of the worst mistakes a trader can make is to increase position size after a long string of gains. Don't just suddenly upsize your risk in the market after a string of good trades: just stick to the plan.

Around Your Trading Plans Develop Your Trading Approach

Without a methodology, system, or approach, the decision-making process can be so overwhelming you will either over-trade or be too conservative, and mistakes will be made. Consistency and discipline are the only ways to win. Having a trading programme is a good way to achieve this.

Technical analysis can help provide a framework, but a programme must go way beyond this. It must have well defined rules. This is what makes trading a business.

- Which markets will be traded?
- Which time frames will be traded?
- Which patterns on each time frame will be traded?

You might then also break down your trading approach into strategies:

- Strategy 1: intraday short-term trading.
- Strategy 2: longer intraday trades based on 15-minute and 30-minute chart formations.
- Strategy 3: long-term positions based on the daily/weekly structure. Usually options work well for this as they are a fixed cost and prevent unexpected sudden margin calls (unlike futures contracts) if a black swan event hits the market.

Components of a Programme

A programme has two components. The first is a theme, strategy, or arbitrage opportunity that can be exploited. The second component defines the actual mechanics. These include entry and exit techniques, a trade management sys-

tem, an overall strategy to manage risk, and account or portfolio management rules:

- Trail a stop and let the market take you out.
- Place an order at a profit objective. If the market does not hit your objective within a certain time frame, take your order to the market. The parabolic SAR stop and reverse technical analysis system can be useful in this respect as it has a time function: if the market momentum starts to slow and things are taking too long it will stop you out.

Trade and Stop Strategies

As a trader and investor we can learn from the commodity risk management area of commodity markets. Companies that use the financial commodity markets not as an investment but as a way to protect against adverse price movements in commodities they produce and sell or actually need to purchase for their manufacturing process have the following elements in their risk management programme:

- trade construction;
- sizing of positions;
- exit strategy;
- scenario analysis;
- choice of leverage level.

As a trader using technical analysis as discussed in Chap. 7, depending on our level of confidence in the analysis of the market situation we can decide whether to buy option contracts (call or put) to limit our risk to the premium paid for those options. If we feel the opportunity is right, here and now, we could buy/sell futures if we are feeling more confident. This is the trade construction. The sizing of positions is the next step in our risk management on any trade in the commodity markets and most traders will look to scale into a position. We execute a small position initially and then, as the market view gets confirmed, we increase the position as the profit builds up in the trade. As you can hear traders say in the market, “the trend is your friend”; so as your analysis proves correct, increase the risk on the trade.

To target an exit strategy we need to have some target for how long the trade will take, and also what profit target we will expect. A lot of this has to do with volatility in the market and momentum in the market. If the market

starts to slow down, trading ranges get smaller, then traders will start to get nervous and look to reduce positions. A good strategy is to look at using moving averages or parabolic SAR or average true range (ATR) technical signals to start warning you that a trend is coming to an end, or if volatility starts dropping in the ATR, for example, that could be the calm before the storm, that is a sudden jump up/down and a trend change.

10

Trading Psychology

From my experience there appears to be one problem that seems to be universal to all traders, whether they're professionals trading in large banks or funds, or part-timers trading from their home. It's called performance anxiety. Performance anxiety afflicts even accomplished individuals in sports and games of skill such as poker and chess. It occurs when awareness of the performance, and especially the outcome of the performance, interferes with the actual act of doing the performing or trading.

In high level sports, performance skills have generally been honed to the point of automaticity. This is especially true of performers in high-speed activities, such as racing car drivers, fighter pilots, and traders. When the performer becomes self-aware and focuses attention on the outcome of the performance, this leads to efforts at conscious control of the automatic activity. The result is a disruption of performance. Heightened awareness of risk interferes with the pursuit of reward.

What causes performance anxiety? Sometimes a single poor performance or set of performances create the view of a "slump" in the performer's mind, leading to efforts at correction that only exacerbate the problem. I have witnessed this countless times when traders stop believing in their abilities or their system or approach and start to try to figure out new ways to analyse or trade the market on the fly. Imagine you are flying a high speed jet fighter at twice the speed of sound and start doubting what you are doing and improvising by pushing all the buttons on the dashboard to see how things go. The

best advice is don't. Our systems and approaches are there to guide us on to the next trading opportunity but also to protect us from ourselves. This is all linked to trading psychology.

You can be a master in technical analysis and learn dozens of trading techniques, but if you can't act in accordance with your analysis of the market, you will ultimately lose money. Computerized trading systems help us protect ourselves from ourselves by enabling us automatically and ruthlessly to keep to our disciplined approach to the market by protecting us via trailing stops, or stop losses linked to volatility, percentage moves in the markets, and so on.

All the personal emotions of fear, hope, and greed, and our own egos, will serve to distort our decision-making process and market timing. A trader's ego is a double-edged sword. There must be a strong enough ego to motivate the trader to initiate a trade in the first place. Yet, on the other hand, many times this ego can keep a trader from taking losses when he knows in his heart, as well as his head, that he is wrong. So having a good trading platform to utilize which you can set up with automatically applied money management risk and profit targets is ideal.

A trader must be able to continue to pull the trigger on trades and avoid making impulsive or sloppy trades where there is no edge. Much of trading is about knowing yourself. The market is a very expensive place to learn who you are. Learn the patterns and times when you get into trouble. Know the situations that are going to draw you into making spontaneous or marginal trades. Never dig yourself so deep into a mental hole that you can't claw your way back out. Never do so much damage to your account that you have to stop trading for a while. Once you have made back a loss, you know you can do it again. Only by closing your losing trades can you start to heal again. It is very hard to trade well with losses on your sheets. Bad positions will be a noose around your neck and will keep you from putting on the good trades. If you are frustrated, don't think about the markets—find a distraction. If you get mad or frustrated, you are going to make poor decisions. As a professional trading manager, I have tapped my colleagues on the shoulder and told them to take a break and walk a few blocks to clear their heads, and they have done the same for me. Concentrate on getting experience. Intuition is just a sum of your experiences. To become consistent, you must control your emotions.

Managing Stress

Stress is a characteristic set of physiological, cognitive, and emotional responses to threat. Generally, these responses speed up such bodily functions and, for this reason, the stress response has sometimes been called the "flight or fight"

reaction. In the face of threat, our bodies prepare us for action: either to attack the source of danger or to run from it.

What constitutes a source of stress is highly dependent upon our perception. If we define something as a threat, we will experience it as threatening, and that will trigger a stress response. For some people, public speaking is an everyday activity, not to be feared at all. It might even be something enjoyable. Others view public speaking as a potentially humiliating event. Their perception of threat triggers the stress response that we call performance anxiety. Cognitive psychologists, however, remind us that it is not the public speaking event itself that is generating the anxiety, but rather our processing of that event. Take away the perception of threat and the anxiety diminishes. Some of us view the world through lenses that emphasize the threat in life events. Once we acquire habitual thinking patterns that emphasize life's dangers, we fall into a chronic flight or fight mode.

In the trading community we now know from cognitive neuroscience research that high levels of distress shift regional cerebral blood flow away from the frontal cortex—our executive centre of judging, planning, and reasoning—and towards the motor regions. This is why it is so difficult for people under chronic stress to work out calmly their problems. Their perceptions of threat create physical and emotional arousal, which in turn make it difficult to access the cognitive capacities most needed at those times. Every trader knows how easy it can be to abandon a well thought out trading plan in the heat of adverse market activity. That's why even the most experienced traders in the market will have a trading plan in mind when they execute a deal.

The term “coping” refers to the actions we take to deal with sources of threat. Broadly speaking, there are three coping styles:

1. emotion-focused coping: dealing with dangerous and threatening events by processing one's emotions and engaging others for support;
2. problem-focused coping: handling threats by focusing on the situation and ways of dealing with it to reduce danger;
3. avoidant coping: avoiding sources of threat or choosing not to think about or deal with a problematic situation.

None of these coping styles are good or bad in themselves. Each can be used effectively, and each can be misused. We know that a coping style is effective when it reduces threat and produces positive outcomes. The best coping style is one that flexibly incorporates all three ways of handling situations.

During normal trading, you might be highly problem focused. However, in a volatile stretch of trading where you get hit with large losses, you may find yourself coping by exploding emotionally and then feeling guilty over the

outburst. Such out-of-the-ordinary coping generally is a sign that an earlier coping mode is being activated. Something about the day's trading is triggering old memories, feelings, or conflicts. As a result, we're no longer using our constructive, adult coping capacities. Instead, we're mindlessly repeating a pattern from the past.

If you find yourself over-reacting to a situation, there's a good chance it's not really an over-reaction. You are reacting to the situation and to something previous in your life that is being stimulated by the situation. The first step of progress you can make in this circumstance is to remind yourself that you're not really reacting to the situation at hand. "This isn't about trading," you tell yourself, "something else is going on." Such a reminder does not, by itself, eliminate the threat response, but it starts the process of putting threat in perspective. That is important. Remember: feeling threatened and stressed is a function of perception. As you alter your perception, you alter your responses.

Concentration

This can be the "make or break" point to your success as a trader. You can't allow interruptions or distractions during periods where you are making trading decisions or monitoring markets. When there is money on the line, you must give it your undivided attention and stay focused. Lack of concentration causes sloppy trading and mistakes. This then undermines your self-confidence. Concentration means giving the task on hand your full attention. If you cannot do this, you should not trade until you get your concentration back. Once a trade is placed and there are resting stops in the market to protect yourself, only *then* would you be all right to divert your attention to another matter. Concentration is focusing on the process or the moment at hand. Take each moment one step at a time. Force yourself to stay in the present. Do not dwell on the past and do not project into the future.

Psychology of Winning

Your mind is the most powerful tool you have:

- Remember the market always gives you an opportunity each day. Avoid overtrading because you are worried there won't be any opportunities tomorrow. The market will be there tomorrow, make sure you are.

- Keep a positive attitude, especially when you are losing. Easier said than done.
- Believe you can accomplish your goals eventually, no matter how long it takes.
- Don't worry about perfection.
- Don't be afraid to make mistakes.
- Do what the "correct action" calls for.
- Steady as she goes. That's where all the money's going.
- If you find an indicator that works, beat it to death.
- Everyday, appreciate the successes you've had, however small.

The Winning Formula

I have trained many traders over the years and of course some people have a natural personality that helps them deal with stress and market situations better than most, but I do think we can isolate some key traits:

1. Passion: you must have a driving force that motivates you to succeed.
2. Game plan: have a strategy by which to attack the market.
3. Commitment: this taps the unlimited source of energy reserve inside you. It provides the strength to keep moving forward each day, even when there is no visible progress.
4. Discipline: a great options trader in the City of London taught me all about discipline in the markets. You must have a trading plan, a profit target/expectation, a trade stop to cut losses, and stick to your plan. If your interpretation of the market is wrong, it is wrong. You will make more money from my experience by recognizing and accepting you got it wrong from getting the market right. When you are right, the market is easier.
5. Patience: this is key, getting the right level of patience to wait for the best trading opportunity to get involved in the market. It is always so easy to get bored and feel you must be in the market, whatever the lack of momentum or volume. The worst thing you can do is get stuck in a sideways quiet market. Wait patiently for the strong trading opportunities with good market volume and activity from participants. Then be patient not to take all your profits too soon. As part of your trading plan it can help to have an initial target where you take some of your profits but let some of your position carry on to see how far the market can really go. In commodity markets more often than not from my experience the market will move further than expected.

Getting Yourself Out of the Dark Corner of Despair

There are those traders who have been in a dark desperate scenario in their trading and those that will. The majority of great traders have gone through long flat P&L (Profit and Loss) periods at some point in their trading career. But just about all extended gloomy trading scenarios have a psychological reason behind them.

Your belief system is always going to be your main weapon in pulling yourself out of a bad time in your trading. The markets are an interesting, stimulating game, but they are also emotionally and, at times, physically challenging. Just like boxing, you have to learn to take the punches. The mental side can be summed up real quickly: one-third beliefs, one-third concentration, and one third managing the stress. Learn how to deal with distractions. They will be present almost every day.

You will have more confidence if you are following a defined methodology and that is where systematic strategies employing technical analysis can come in very useful to build a disciplined approach to the market. Follow your game plan. Learn to put mistakes out of your head quickly. Let them go. There is nothing you can do when a mistake has been made except to correct it immediately and carry on.

Even after holidays and a break from the market it can be difficult to get back into the market. Many traders I know when they return to the screen will just buy or sell one contract to get back in. This immediately focusses the mind and attention. Like riding a bicycle after many years, the only way is to get back on it.

Recovering from Losses

Making back a big loss is the most empowering feeling in the world. Once you have pulled back up to even, you are ready to make new account highs. Stress impairs your judgement.

Learn to recognize when you are under duress. Your mental state outside the markets will affect your decision-making ability during market hours. A person can have knowledge, but if he or she doesn't have the presence of mind to handle a stressful situation, all that knowledge goes out of the window. It takes confidence to be flexible. It is easier to change your mind when you are relaxed. When you are tense, it blocks energy and this blocks the mental flow.

The old saying of money makes money works in the trading world. If you are profitable and making money, you are relaxed and may do really well even more, as long as you don't suddenly size up your risk at the wrong time.

Mental Toughness

Monitor your very first trade or instincts to see if you are reactive or not. If you are emotional, why? No game plan? Not prepared? Too many positions? Have you just had a big winner or a big loser? Once again, know yourself and your style. Do you fight back when you have losers, or do you hold back on pulling the trigger?

Every great trader will have periods when he or she is not in the right space to trade. Evaluate yourself after a losing spell and see if you can identify whether there were external factors that got in the way. Learn to recentre and regroup.

Where do you get yourself into predicaments? Avoid situations that get you into trouble. Which is worse: seeing the trade but not acting on it, or over-trading and not distinguishing between the high versus the low probability trades? You can't look back at the trade you have just blown. You can only look forward. You must stay in the here and the now. Only look forward and do whatever it takes you to keep going. If you perceive that the loss is going to get worse, get rid of it right away. Put on the biggest positions when you are at the sharpest point in the game. Is that the first part of the month when you are fresh or the last part when you already have profits to play with? What is the personality of the market for the day? Some traders use a model of a market manipulator, a "composite operator", or a "pool operator". Are the big players present on the day? This is like assessing the weather conditions for the day. Is it the type of day that you can make hay on?

When Things Go Bad

Talk about your fears or problems. Acknowledge them. This is the first step in learning how to deal with them. Reflect on what happened, why did you take a loss? It feels bad to lose money trading but even worse when you don't know why. If you can learn from the mistake you made, which could be isolated to either bad money management (financial stop loss protection) or bad analysis of the market, you can develop and improve upon your trading approach the next day.

This is why it's so important to have a trading plan, so you can reflect properly on your trading habits and importantly reflect and improve upon your approach to the markets when things did not go right.

It certainly feels better to be able to say, "OK that was a bad day in the market, but I know why, and I am not going to repeat the same mistake again."

11

Commodity Market Risk Management

Risk Management in Commodity Markets

The majority of this book has focused on futures and option contracts which are traded and cleared on exchanges. The Intercontinental Exchange and the Chicago Mercantile Exchange are the two largest currently around the world.

However, the vast majority of energy commodities, plastics, petrochemical, and some niche agricultural markets remain in the over-the-counter (OTC) markets, where traders and banks trade these products directly with one another via bilateral contracts or increasingly executed off-exchange but post execution given up and cleared at an exchange of central clearing party.

In this chapter we discuss some of the general risk management issues you must look in to and set up policies for if you embark on OTC trading and investing via swap (like futures just traded directly with other counterparts) or option contracts and other bilaterally traded professional derivative markets in commodities. These are summarized in Fig. 11.1.

Firstly, companies need to be better prepared to deal with the impact of another investment bank or large commodity trading company failing if they are trading directly with another counterpart without the credit and performance guarantees of a regulated exchange/clearing house. Secondly, shareholders require the reassurance that businesses understand the risks they face and are sufficiently protected against them. Thirdly, where risks are understood and managed appropriately, access to investment capital is improved. Fourthly,

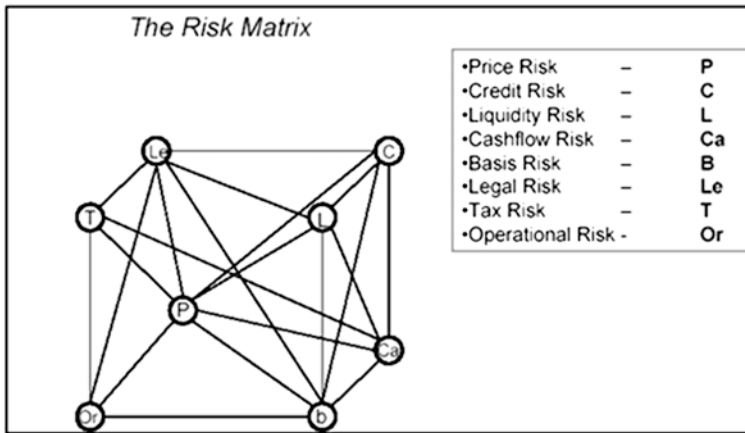


Fig. 11.1 The risk matrix (Source: Navitas Resources Pte Ltd & Tom James © 2001–2015)

while regulators are focusing on investment banks at present, they are also looking at the commodities markets more closely. New measures have been proposed by the CFTC (Commodity Futures Trading Commission), including possible position limits on a range of commodity contracts. These and other proposals currently under consultation would create the need for changes to commodity companies' risk management procedures, monitoring processes, and potentially even have an impact on their business strategy (Fig. 11.2).

Lessons Learnt from Banks Errors

So just how should commodity companies go about addressing the gaps in their risk management frameworks? One approach is to study the improvements being made by investment banks to their risk management procedures, following the painful lessons of the financial crisis which have revealed many flaws in the banks' approach. Bankers risk-measurements lacked an accurate understanding of exposures and correlation to macro-factors, which was highly reliant on credit rating agencies. There was also insufficient focus on the stress testing of portfolios, using both historical and forward-looking scenarios.

In response to the crisis, investment banks have finally started scrutinizing their portfolios more carefully, making use of robust, back-tested, independent modelling techniques. As a result, they are gaining a truer understanding of their risk exposures with more accuracy than before. Greater use of stress testing is being made, including sensitivity tests with risk variables which extend beyond "normal" moves. Scenario tests—where historical and extreme



Companies require consistent tools and techniques across credit, market and operational risk. They should move beyond the Traditional divisions of credit, market and operational risk to gain a better understanding of how these risks overlap, interact and impact the business overall.

Fig. 11.2 Credit, market, and operational risk

events are modelled—are used to stress the portfolio. Importantly, financial institutions have realized that reliance on mainly one risk measure, such as Value at Risk (VaR), is insufficient, particularly as the assumptions underlying VaR analysis break down where extreme events are involved. As a result, banks are now looking at VaR analysis in combination with stress test results, “what if” scenario modelling, and reverse stress testing, that is scenarios that could cause an individual company to fail.

Market Risk

Although risk traders at commodity trading companies have attained a considerable degree of sophistication in relation to market risks, firms tend to be skilled mostly at monitoring and measuring market risk. Commodity businesses need to adopt a much more dynamic approach towards the management of market risk and the efficient utilization of risk capital. Firstly, trading companies should identify any risks not captured in their current risk management or VaR framework and include these in the programme list for prioritization. Having all risks flowing through the VaR framework improves the completeness and quality of risk management, as well as reducing the requirement for manual intervention.

In order to manage market risk more dynamically, energy companies (like banks) should make greater use of stress testing, which must become a regular part of their risk modelling process and not simply be used as a stand-alone measure. This should incorporate varying probability weights, so that firms gain a better understanding of the risk range, and include historical scenarios, for example the oil price crash of 2008, as well as user-defined scenarios.

Running sensitivity tests can be useful too, for example to discover the impact of an event such as a 50 % drop in oil prices or a breakdown of price correlations. In addition, firms could consider the introduction of black swan testing, that is stressing a portfolio with a risk factor previously ignored or considered to have little likelihood of occurring. Examples could include the euro losing its currency status or Russian gas supplies to Europe being cut off. What type of scenarios should commodity and energy companies model?

The scenarios chosen should be unique to each company, as firms need to understand what factors are most critical to their own business model. Oil companies could ask themselves what would happen if the crude oil price fell to \$10 per barrel, liquidity within the oil market completely dried up, or the consequences if oil assets were seized by local governments. For power companies, a comparable scenario might be the discovery of a design fault in a nuclear power station or the failure of the TSO's (transmission system operator) control centre. Firms active in the gas markets might wish to understand the effects of a significant trading disruption at a gas hub or the loss of a large storage facility. Importantly, whatever stress scenarios are used, these should be reviewed regularly and adjusted to reflect changes to the company's circumstances.

The scenarios outlined above may be thought of as extreme situations but they are worth planning for. Until recently, few would have thought that a cloud of volcanic ash could have caused such disruption and heavy financial losses to the aviation industry. Importantly, stress testing enables businesses to determine their readiness to deal with (increasingly) extreme events. It allows them to understand more accurately the risks they face, to be better prepared, and to provide investors with a clearer picture of the risks involved in the business operation.

Finally, regular back-testing should be carried out, ideally on a daily basis. This involves comparing the previous day's actual P&L (Profit & Loss) with daily VaR numbers. This is important from a regulatory point of view and also essential to ensure management confidence in risk management processes. Steps should be taken to ensure that the number of exceptions—losses larger than estimated by the VaR model in frequency and size—are understood and corrective actions incorporated into the risk management model. Back-testing of expected tail loss can also provide an indication of how well the model

Table 11.1 VaR and stress testing comparison

	VaR	Stress testing
Approach	Statistical	Qualitative
Length of period analysed to determine market risk	Recent past	Historical or potential extreme events
Assumptions about market behaviour	Normal market conditions	Extreme market conditions
Main uses	Measure and control risk in "normal" market conditions	Minimize large potential losses (stress tests limits)
Volatilities and correlations	Stability assumption	None necessary

captures the size of expected loss beyond the traditional 95 % or 99 % VaR confidence levels.

VaR is a statistical model, it's not perfect, it will help give you an idea of the investment risk you have in the market as a speculator investor, or how much you have left as a commodity producer or consumer hedging during normal market conditions, for example 95 % VaR tells you that in 1 in 20 days you might expect to see an unrealized loss of \$X. It does not prepare us though for the what-if extreme market scenarios: either a repeat of situations that we have experienced in the past in the commodity markets we are trading, or hypothetical scenarios that we could see happen in the future (Table 11.1).

Most commodity trading teams will have weekly meetings to discuss economic, geopolitical, and supply/demand and price scenarios that could take place based upon government meetings or announcements expected during the week.

1. Historical scenarios. These are usually actual Historical Price events that have occurred in the Commodity market.
2. Mechanical stress tests:
 - commodity forward price curve shifts;
 - changes in the volatility curves.
3. Hypothetical scenarios (user-designed scenarios of fluctuations in risk factors).

Figure 11.3 illustrates the best practice approach to combining VaR modelling of the risk we have in the commodity markets with the stress test of what-if scenarios.

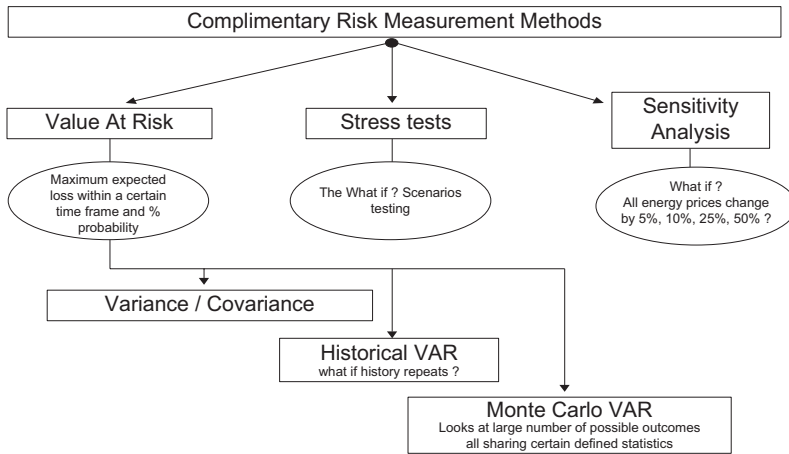


Fig. 11.3 Complimentary risk measurement methods

Credit Risk

Traditionally, while credit risk has always been an important consideration, the main focus within commodity trading companies has been the monitoring of counterparty credit risk and limiting counterparty exposure by applying credit lines—the credit risk traders’ primary responsibility has been to make certain that trading remains within these limits. Most of the initiatives taken to improve efficiency in this area have been aimed at optimizing this credit risk monitoring process. While firms are skilled at monitoring credit risk, they still need to improve the way it is measured and adopt a more active approach to its management. Turning first to the measurement of credit risk, many energy trading businesses only measure credit risk as *current* exposure. They should, in fact, give more attention to potential *future* exposure (PFE), which is more consistent with the measures used for market risk. Firms should also be aware that developments have occurred in the way PFE is measured, with more sophisticated organizations using Monte Carlo and variance/covariance techniques. Businesses need to make use of what is appropriate to their needs—avoiding over-engineering and selecting techniques that fit the firm’s activities.

Importantly, commodity trading companies need to manage credit risk more actively. Firms should invest in capabilities which allow traders to drill down into risk results, in real time. These capabilities aid firms to gain an understanding of the contributors to risk and to provide an insight into

where it is concentrated. They also enable companies to identify positions or trades which place a counterparty significantly outside the normally acceptable limits of risk. Such credit exposures can then be hedged by trading credit default swaps, thereby also realizing value from price arbitrage between the various counterparty credit spreads, an approach often used by investment banks.

On a daily basis, a company needs to identify deviations from its approved risk distributions policy by identifying high risk counterparties so as to manage marginal credit risk actively. It could reduce risk by going long on credit default swaps against the high risk counterparty and possibly bring VaR to consistently lower levels, without having to lose out on the benefits of dealing with “higher risk” market participants. The company could also choose to bring the VaR back in line using other routes, for example through the use of central clearing, netting, identifying a natural hedge, by asking for additional collateral, or even exchange trading. Clearly, there are a number of possible avenues the company can take. However, the essential point is that the company is actively managing VaR from an informed position—an approach which is largely lacking at present.

In order to manage credit risk even more efficiently, commodity trading companies also need to rethink their attitude towards collateral. At present, collateral tends to be viewed by most energy firms as static data. For example, a company sells crude oil to another market participant, which has posted \$10 million collateral. The first company views this collateral value as a credit risk offset but ignores the fact that the value of the collateral changes as the market moves. If the market moves adversely, not only does the collateral value potentially fall, but the exposure to the market participant increases, creating an even greater degree of credit risk. This is an important aspect and one which needs to be considered more carefully by energy companies.

In addition, commodity trading companies must ensure that changes to counterparty exposure due to macroeconomic factors are understood and modelled better. Systems and procedures should be upgraded so that the volatility in the collateral and macro-impacts can be measured, monitored, and managed. This will ensure that the correct offset to credit risk exposure is used in credit risk calculations.

Finally, as in the case of market risk, commodity trading companies can improve the efficiency of their credit risk management processes by firstly capturing any risks not already included in their current risk management frameworks, and secondly through back-testing.

Liquidity Risk

Trading liquidity risk (an area which overlaps with market and credit risk) is another field in which companies should consider introducing a more consistent approach to monitoring, measuring, and managing risk. If liquidity falls when an energy trading company is carrying out a transaction, and the company buying cannot unwind or hedge the position fast enough, liquidity risk is created. Investment banks actively manage trading liquidity risk by monitoring the market bid–ask spreads and building this into their market making and pricing models. Energy companies need to consider this aspect and build a charge into their pricing models, both to avoid falling into a liquidity trap and to manage trading liquidity risk more efficiently.

Operational Risk

Operational risk management is, generally speaking, in an immature state at most commodity trading companies: businesses tend not to have dedicated operations risk traders, nor is operational risk understood at a sufficient level. Companies are only now beginning to monitor trading operational risk, while its measurement is still in its infancy. Indeed, the industry is only just becoming aware of the need to use benchmarks or metrics to measure and understand operational risk. As with other types of risk, there can be no proper management if companies have no adequate means of monitoring and measuring it.

One example of particular weakness is trade confirmation. The process is riddled with delays and, even at large companies, can take up to a few weeks, depending on the complexity of the transaction and issues encountered in the contract terms and so forth. If a counterparty fails in the intervening time, the impact is likely to be significant and may involve hardship. In contrast, a number of investment banks are now able to process confirmations quite rapidly. Commodity companies should aim to emulate financial institutions in this respect—measuring confirmation times against industry benchmarks, both to improve efficiency and to reduce the risk of being unable legally to enforce an unconfirmed trade, in the event of counterparty bankruptcy. An understanding of the potential financial impact might focus attention.

Invoicing constitutes another problem area. Here, similar delays can occur to those encountered in the confirmation process, with complex pricing terms and delivery quality issues often being the root cause of the delay. Again,

commodity businesses would do well to put in place metrics to measure and monitor operational processes such as invoice generation. This, in turn, would allow firms to identify weak spots and to take remedial action.

Finally, for firms operating in the physical commodities arena, other types of operational risk need to be considered. In particular, businesses need to assess the efficiency with which physical assets operate. In this respect, metrics aimed at measuring the commercial availability of an asset can also play an important role. Indeed, some large energy firms already make use of these metrics. For businesses that do not yet carry out these assessments, forming partnerships with agencies which undertake benchmarking exercises of operational processes will prove beneficial.

Individual commodity trading companies have attained differing levels of sophistication in relation to the monitoring, measuring, and managing of market, credit, and operational risk. In particular, companies must abandon old attitudes which view market, credit, and operational risk as separate heads and operational risk as the “poor relative” of the other two. In contrast, firms need to establish where the risks overlap in their businesses and quantify these interactions in a consistent manner. Companies must become more sophisticated in the measurement of risk, as well as active in its management.

Many financial institutions when they review the credit worthiness of counterparts and clients in the commodity sector will look at their detailed risk management policies. If your firm, whether an investor/trader or a commodity hedging firm, can demonstrate you have clear, best practice controls and policies in place and they are well documented procedures, then you stand a better chance of getting that investment from shareholders or the loan from the bank. Finally, businesses should ensure that similar types of tools and techniques are employed, across all types of risk, in order to ensure its consistent management and help provide a more enterprise-wide view of risk.

Categories of Risk

Coming Back in Focus on Investment Traders in the Commodity sector and Traders.

The emphasis on the categories of risk (As shown earlier in Fig 11.1 Risk Matrix) that will need to be measured, monitored, and managed will vary depending on the products traded, investment strategies, and frequency of trading it chooses for its funds, that is what level of liquidity will you give investors, are they locked in, or are they able to take their money out each month if they want to?

Accordingly, within the risk management framework, the trader should consider what categories of risk are material to the fund and adopt risk management measures most appropriate to the investment approach. To assist traders in this regard, the rest of this section describes the principal categories of risk that a trader may need to measure, monitor, and manage in the operation of the business. The discussion also provides examples of measuring techniques and risk management tools that may be applicable to each category of risk. While traders should reflect on the broad categories of risk, the particular risk management methods undertaken should be appropriately tailored to the specific risks faced by the fund and the fund's risk profile.

In many cases certain of the risk management tools described below may be less relevant to a particular trader, while in other cases a trader may determine that risk management tools not described here should be used.

Liquidity Risk

Liquidity is the investment trader's/trader's ability to meet its need for cash it is also a term used to describe the normal volume in the market being traded. Sufficient levels of cash liquidity enable the trader to meet its obligations and sufficient market liquidity allows the trader to get into or get out of its positions easily. The following are types of factors that a trader should take into account in managing liquidity:

- the risk of a reduction in the funding provided by lending counterparties, including changes to initial margins/credit support and timing or size of variation margin calls, as per various agreements with counterparties;
- the terms of redemption rights by investors and the amount of investor capital that is subject to those redemption rights;
- changes in market liquidity conditions (including trading volume, bid–ask size and spread, and the possible effect of crowdedness/concentration of trading strategies) that may alter the ability of the trader to sell securities with minimum adverse price impact or otherwise manage the liquidity of the portfolio.

The trader should seek to increase the stability of external factors affecting the portfolio through prudent agreements with lenders and investors. The trader should thoroughly understand and regularly review the material terms in its credit and lending agreements, including the interaction of those terms, cross-default and cross-collateralization provisions, and their impact on col-

lateral management and requirements. These terms may affect the availability of funding in the event of certain extreme market conditions or triggering events (e.g., limitations on prime brokers' obligations to provide financing under certain circumstances or NAV - Net Asset Value triggers) and the overall risk faced by the fund. In addition, the trader should review these agreements from the perspective of how they protect the fund from the risks arising in the event of adverse developments with respect to the counterparty.

The trader should consider regularly conducting liquidity stress scenario analyses on the portfolio(s) in order to understand and better manage its ability to meet obligations in light of the fund's portfolio.

The trader should be aware of the risks of holding certain short-term cash-like instruments (such as money market investments and short-term securities that depend on a liquidity put) as a substitute for cash in light of the potential for illiquidity, unexpected delays in satisfying redemptions, and the resulting mismatches in funding requirements.

Leverage Risk

Leverage is the practice of using borrowed money to make investments. For portfolios without derivative contracts, leverage may be defined as the market value of assets relative to the fund's capital. For more complex portfolios or portfolios containing derivatives, it may be more appropriate to estimate leverage by analysing the risk of different strategies and understanding the potential for extreme losses arising from those strategies. The trader should manage its use of leverage to match the risk profile established for the fund based on its size, portfolio structure, and specific investment strategies. The trader should monitor changes in this measure over time as part of its risk management framework, and should take account of on and off-balance sheet assets (e.g., derivative instruments, including OTC derivatives) in measuring leverage.

1. The trader should monitor leverage with a frequency appropriate to the characteristics of the underlying portfolio taking into account the potential impact of various interrelated factors such as:
 - asset types, sectors, and positions;
 - overall liquidity profile of the portfolio;
 - trading strategies employed by the trader;
 - volatility of assets and trading strategies;
 - the concentration of trading strategies.

2. The trader should thoroughly understand the terms on which prime brokers, lenders, and other trading counterparties provide leverage to the fund and seek sustainable credit, margin, and funding terms in order to manage its leverage prudently and minimize additional stress when market conditions become volatile. Important terms may include constraints on the portfolios (e.g., concentration, diversification, and liquidity limits) and prime brokers' and counterparties' rights to alter these terms.
3. The trader should take into account the impact of employing leverage on any positions with embedded leverage, such as certain types of derivatives and other structured products.

Market Risk

Market risk is the financial risk brought about from changes in the market price of investments in the portfolio. The trader should regularly evaluate market risk, incorporating some or all of the following risk measures, as applicable to the fund's size and portfolio management processes and the complexity of its investment strategies. The list below comprises the primary market risk processes used in the industry. A trader should model its risk management framework through the inclusion of some or all of these in such a framework.

Risk exposures for different market variables and asset classes:

1. The trader should seek to identify the size and direction of its exposures to major market risk factors (e.g., equity indices, interest rates, credit spreads, foreign exchange rates, and commodities prices).
2. These exposures should be considered both on a gross (longs plus shorts) and net (longs less shorts) basis and examined both within individual strategies and portfolios and across the entire fund. Risk systems should also distinguish between linear exposures (i.e., prices that change proportionately with changes in the overall market) and non-linear exposures (i.e., those that arise from instruments such as options, convertibles, and callable bonds).

Conducting stress tests and scenario analyses:

1. The trader should conduct stress tests and scenario analyses of its portfolio, which can be useful in assessing its vulnerability to various events. The tests should be designed to capture both market events (directional movements) and situations of market illiquidity. The frequency of such testing should

depend on the nature of the portfolio, the risks to which it is exposed, the frequency of turnover, and changes in market conditions, among other factors. The trader should identify which market variables to stress, how much to stress them by, and over what time frame.

2. Stress tests/scenario analyses can be based on standardized measures, historical events, or unique scenario analyses:
 - Standardized stress tests involve shocking major market factors by a constant amount or percentage moves (e.g., up or down by 5 % or 10 %). Using both approaches enhances stress testing with regard to factors that may undergo regime shifts (i.e., moving from tight to wider bid offer spreads, or from a low to higher volatility environment). These tests are useful tools to translate risk exposures into potential profits and losses given a major change in the market.
 - Historical scenario analysis aims to measure the expected behaviour of the portfolio if a period of known market stress reoccurs in the future. The calculation process must adjust for new instruments and changes in market structure.
 - Unique scenario analyses aim to measure the expected behaviour of the portfolio during an unexpected period of stress, as specified by risk management.

Historical risk measures aim to understand the historical behaviour of a portfolio versus expectations and can be used as a predictor of future behaviour when asset composition and market conditions are relatively stable:

1. If the trader determines to monitor historical statistical portfolio risk measures, it should do so by analysing measures such as realized volatility, return as a function of volatility, worst drawdown, historical beta, and correlation with relevant market indices. It is prudent to analyse these measures at a frequency appropriate to the characteristics of the fund in order to understand how these realized risk measures may differ over various time horizons.
2. Such measures may become less relevant if the asset or strategy composition of the portfolio changes frequently, the market structure evolves (e.g., regime shifts), or the periodicity of valuation is inappropriate (e.g., daily volatility may be an inappropriate measure for investment positions that are marked-to-market monthly).

Forward-looking statistical risk measures aim to forecast the expected behaviour of the portfolio through quantitative techniques using assumptions on the volatility and correlations of assets in the portfolio:

1. If the trader determines to use prospective statistical measures as a risk monitoring tool, it should consider which forecasted statistical measures are applicable to its portfolio. Two common, though not universally used, examples are VaR and expected loss.
2. When using forward-looking statistical measures, their shortcomings should be recognized. These measures commonly use a normal distribution of returns as the basis of the calculations. However, because financial markets frequently exhibit unusual, so called “fat-tailed” behaviour, many forward looking statistics systematically underestimate portfolio risk. Moreover, assumptions concerning the volatility of the assets in the portfolio and the correlations between assets may not reflect actual experience. In addition, these measures may be difficult to calculate for multi-asset portfolios and portfolios with optionality.

Where applicable to the fund and its investment strategies, the risk management process should examine whichever it uses of the measures outlined above at both the overall fund and portfolio level as well as by individual investment strategy, asset class, industry group, geographical region, or other dimensions.

In light of the use of assumptions and uncertainty with respect to events, risk measures may provide more insight when looked at over time. A particular data point may be more useful when viewed in the context of how that same measure has changed over previous days, weeks, and months.

It is important to review periodically the performance of models used to measure and monitor market risk and adjust as appropriate to maximize effectiveness. This may be performed by measuring risk estimates over time against the realized return of the portfolio:

1. changes to models and assumptions should be made to factor in new data and to account for previously unrecognized relationships or risk factors;
2. traders should understand the limitations inherent in risk models, such as assumptions in the inputs and limitations of historical data.

Traders should use results from these risk models after quantitatively taking into account these limitations.

Counterparty Credit Risk

The trader should monitor its fund's exposure to counterparty credit risk (including, as applicable, OTC derivative counterparts, prime brokers, derivatives dealers and lending, trading, cash management, and depositor counterparties) and understand the impact of potential counterparty loss of liquidity or failure:

1. The trader should assess creditworthiness when selecting and transacting with counterparties (recognizing that subsidiaries and affiliates of counterparties may have different creditworthiness than parent companies).
2. The trader should understand the complexity of the legal relationships a fund may have with its prime brokers and any other significant lending or derivatives counterparties and their affiliates, including:
 - Understanding the legal entity with which the fund has contracted is important in order to understand the fund's ability or inability to close out, or net positions with a certain counterparty, or prime broker and its affiliates in the event of an insolvency proceeding, or other default and the impact of insolvency on the fund's rights with respect to and its ability to access positions.
 - Understanding the way in which the prime broker finances the fund's positions, including whether it uses US and/or non-US broker-dealers or banks, whether assets are segregated and rehypothecated, and the location in which its positions are held.
 - Knowing the identity of custodians and sub-custodians used by the prime broker in various locations and, depending on the availability of resources, assessing the risk associated with the use of such custodians and sub-custodians, particularly in developing markets. Factors to be taken into account include the risk/reward of investing and the size of the business with that particular sub-custodian.

The trader should measure and monitor its credit exposure to each counterparty (as appropriate, given the level of the fund's exposure to each counterparty):

1. As part of this process, the trader should weigh the desirability of diversifying counterparty credit risk by using multiple prime brokers and counterparties against any increases in the complexity and practicality of settlement, reconciliation processes, and daily collateral management. The trader

should dedicate appropriate resources to manage its collateral movements and, where possible, aim to reduce mismatches with a counterparty (e.g., by maintaining reasonably hedged portfolios with each prime broker).

2. To minimize risk in the event of market stress, the trader should consider taking steps to increase its access to liquidity, such as opening cash and custody accounts at financial institutions other than its prime brokers.

Aside to Moody's and S&P credit ratings, many commodity traders in the OTC market also utilize data from the credit default swaps (CDSs) markets, for example CreditEx, an electronic exchange. The CDS market lets firms trade derivative products in the perceived real-time credit risk of a company, government, or country. Despite Lehman Brothers having a AAA rating from traditional credit assessment agencies in 2008, its CDS price was moving up rapidly the week before it was announced to be bankrupt. This data could have warned a company to reduce its exposure to Lehman Brothers if it was looking at this data.

Operational Risk

The trader should have a strong operational infrastructure that is commensurate with the complexity of its business, to manage and mitigate operational risks resulting from inadequate or failed internal processes, people and systems, or from external events:

1. One or more senior operating officials, who may include a chief operating officer, with functions separate from investment management, should oversee the trader's operational areas.
2. The trader should implement and maintain strong internal controls to minimize the risk of loss as a result of operational risk.
3. Controls to reduce operational risk may include (as applicable to a trader):
 - use and maintenance of a centralized position dataset;
 - adoption of trade capture devices;
 - prompt reconciliation of trading information with the fund's prime broker or settlement agent and administrator.
4. The trader should monitor its overall level of operational risk, either internally or through third-party review. This review may take into account the following characteristics of the trader (as applicable to a particular fund):

- assets and products;
- staffing and resources;
- infrastructure (including information technology resources, business continuity, and disaster recovery planning);
- compliance and regulation.

The framework should include:

1. Policies and procedures which provide for appropriate checks and balances for the significant operational and accounting controls, including:
 - appropriate selection and management of counterparty relationships;
 - effective management of cash, margin, and collateral requirements;
 - careful selection of key service providers;
 - strong infrastructure and operational practices;
 - strong operational and accounting processes, including appropriate segregation of business operations and portfolio management personnel;
 - a disaster recovery process.
2. Systems, infrastructure, and automation commensurate with the scale of the business and trading operations of the trader, including regular review of such infrastructure to assess operational risks in light of both internal and external changes.
3. A member of senior management, such as a chief operating officer, with responsibility for the trader's business operations, supported by internal personnel or, where applicable, external resources, with skills appropriate to the complexity of the trader's business operations. This role and the operational areas of the firm should coordinate and work in partnership with the investment professionals and senior management.

Counterparty Selection Criteria in OTC Commodity Investment Products and Derivatives

The selection of counterparties:

1. Traders interact with a variety of counterparties and should exercise reasonable due diligence in selecting the counterparties of the funds that they manage. Typical counterparties that a fund will encounter include:

- brokers;
 - OTC derivative counterparties;
 - prime brokers;
 - banks;
 - cash management counterparties.
2. When selecting counterparties, the key factors that a trader should consider include:
- Creditworthiness, reputation, experience, and identity of the specific entity.
 - Ability to provide an appropriate level of service to the trader in light of the trader's business needs (including complexity of products and frequency of trading), such as:
 - (i) efficient and timely transaction processing, reporting, clearing, and settlement;
 - (ii) financing capabilities necessary to support the trader's business;
 - (iii) adequate staff to be able to service the trader's needs, including the support and reporting of information to prepare books and records;
 - (iv) terms and conditions for movements of margin and cash required by transactions.
 - Regulatory environment in which the counterparty operates.
 - Stability of terms on which the counterparty is willing to provide service to the trader (such as term funding lock-ups for prime brokers).

Relationships with counterparties:

1. The trader should negotiate and maintain with its counterparties signed agreements governing the terms of the relationship (e.g., account opening, prime brokerage, stock lending, ISDA, and give-up agreements). The ISDA Master Swaps Agreement (International Swaps Dealers Association) is the most popular swaps OTC commodity trading agreement in the market currently.
2. The trader should carefully review the details of the terms of these agreements to understand the risks that can affect the counterparty's obligation to extend credit or provide other services (such as terms that can increase collateral requirements).

3. Where multiple counterparties are used, the trader should devote appropriate resources to managing the operations of the fund across those multiple counterparties.

Cash, margin, and collateral management:

1. The trader should have a framework for managing its cash balances and processing any margin or collateral calls from its prime brokers, financing, and OTC derivative counterparties. In developing this framework, traders should carefully consider industry practices and developments in this area.
2. The trader should:
 - understand and monitor its compliance with credit agreements;
 - understand and monitor the amount and type of collateral required to support positions;
 - verify marks used by the fund's counterparties to value its positions for collateral purposes;
 - verify and meet margin calls in a timely manner.

Selection of key service providers:

1. The trader should select reputable service providers that have expertise and experience suitable to support appropriately its business. These service providers may include, where appropriate:
 - providers of accounting, consulting, and proxy services, IT product vendors, and legal counsel;
 - the fund's administrator (where one exists).
2. The trader's selection and monitoring process for its service providers should take into consideration each service provider's independence and controls over its activities.
3. In engaging key service providers, the trader should enter into agreements that clearly delineate the service levels to be provided to it. Such services should be appropriate in light of the trader's internal infrastructure and the complexity of its operations.
4. The trader should monitor the quality of service provided by key service providers.

5. Responsibility for any outsourced parts of the process continues to lie with senior management or its designees.

Core infrastructure and operational practices:

1. The trader should develop infrastructure and operational practices tailored to its business. Requirements for the infrastructure needed will vary depending on the types of investments, frequency of trading, and the need for manual processing, as opposed to the availability of automated systems.
2. The trader should consider whether the implementation of automated processing systems is appropriate to reduce settlement risk. Depending on the size and complexity of the organization, automation may be appropriate, where available.
3. The trader should provide for appropriate reporting-up policies for resolving material breaks, errors, or other matters that could potentially cause risk of loss to the fund. The trader should employ business process monitoring, analysis, and optimization techniques to identify and address breaks and inefficiencies.
4. Depending on the size and complexity of the organization, the trader should endeavour to cross-train personnel or otherwise have appropriate back-up, so that key operational functions are not dependent solely on one individual.

The trader should adopt procedures for clearing and settling transactions and for wiring funds. Such procedures may address:

- the reconciliation of positions and cash accounts across counterparties, such as prime brokers, futures clearing accounts, the fund's administrator, and front office, including prompt resolution of failed trades;
- an appropriate procedure for cash movements, including authorized signatories and appropriate checks and balances;
- the appropriate segregation of duties between investment and operational personnel, including confirmations that should be sent to non-trading personnel;
- the use of industry utilities and software tools (such as DTCC - Depository Trust & Clearing Corporation) in an effort to automate the trader's OTC derivatives processes, where the volume and complexity of its business warrants it;
- a process for addressing corporate actions, such as mandatory elections, voluntary elections, dividends, splits, and reorganizations;

- a process for monitoring and taking timely action on all positions that have expiration dates (e.g., options, warrants, rights, and conversions).

Additional Infrastructure and Operational Practices

If a trader undertakes material trading activities in the OTC derivatives market or other more complex markets (such as bank debt, mortgage-backed securities, equity derivatives, structured credit trading, or private transactions), it should devote the resources necessary to maintain infrastructure, personnel, and processes that are sufficiently robust to handle the added complexities of these instruments and markets, including working closely with counterparties and remaining informed of, and responsive to, overall market trends. A trader who trades in complex products should consider the need to maintain additional systems or to hire or engage personnel with specific skill sets necessary to manage appropriately such complex products. The lists below represent examples of derivative and complex product practices and are neither exclusive nor exhaustive.

The fact that OTC derivatives are individually negotiated transactions that can have unique characteristics and terms makes them especially challenging to manage from an operational and business perspective. Accordingly, when trading in OTC derivatives, the trader should consider the need for the following:

- negotiating appropriate ISDA master agreements with all of its OTC derivatives counterparties;
- negotiating bilateral collateral agreements with its counterparties whenever possible;
- appropriate systems to record all material terms of all OTC contracts to facilitate the appropriate pricing and risk management of these portfolios;
- processes to monitor and promptly report-up the resolution of any derivative transaction not supported by a counterparty term sheet detailing the economics of the trade;
- procedures for monitoring outstanding confirmations (e.g., not yet received, in review, disputed, or aged) and performing risk analysis, timely mitigation (e.g., prioritization), and expeditious resolution of outstanding confirmations;
- review of counterparty OTC margin calls and a process for assessing when the trader should make its own OTC margin calls to brokers, as appropriate;

- appropriate processes and procedures to facilitate the trader's ability to adhere to the industry's novation protocol and transaction processing time-lines, and other industry protocols that may develop;
- review of final payoffs for complex derivatives.

Practices for other complex products:

1. *Bank loans.* The trader should assess whether it has the appropriate systems and personnel to manage the extended settlement cycles and unique features of these products. In addition, legal advice from appropriately skilled internal or external counsel is often needed to manage the documentation around these transactions, particularly in the distressed arena.
2. *Private transactions.* The trader should assess whether it has appropriate resources such as internal and external legal, tax, and structuring expertise that is adequate to support these transactions. In addition, custodial arrangements may be needed to provide for appropriate safeguarding of investment positions of this type. There should be periodic confirmation with counterparties of open positions.
3. *Transactions in foreign markets.* These types of transactions require an understanding by personnel or service providers of local regulatory, market, and tax infrastructure and settlement conventions.

Staffing and Resources

The trader should regularly assess the appropriate level of staffing and resources for complex or unique trading strategies from an operational and business risk perspective and be willing to maintain that level.

Core Accounting Processes

The trader needs to have appropriate systems, processes, and personnel in place, such that the trading activity of its funds and all related contractual arrangements and agreements can be appropriately recorded from an accounting perspective to allow for the calculation of both fund-level and investor-level net NAVs, as well as the production of other important financial data that is necessary to meet investor, risk, financial statement, and tax reporting requirements. In this regard the trader:

1. Should have internal or external personnel with an appropriate level of accounting knowledge and experience.
2. Should have access to systems appropriate to the needs and complexities of the firm, and be capable of correctly recording the trading and non-trading activities of the funds from an accounting perspective.

These may include:

- systems that maintain important trading-related data, including quantity, cost-basis, market-value, realized and unrealized trading gains/losses, interest and dividends, and trading-related fees and expenses;
 - a general ledger that includes trading data (whether in detailed or summarized form), as well as non-trading-related data, such as management fees and expenses;
 - a process that allocates the fund level results to individual investors to allow for reporting at the investor level;
 - processes (in addition to the valuation processes discussed above) to ensure that all non-trading related activities are appropriately recorded from an accounting perspective, including management fees, incentive fee (oral location) arrangements, and other fees and expenses, as outlined in the fund's organizational documents.
3. Should implement a month-end close process (or if not monthly, then at least as often as required by the fund's organizational documents). Some processes that may be appropriate in light of the characteristics of the fund include:
 - verification that any material valuation adjustment is appropriately recorded;
 - verification that all non-trading-related activity is appropriately recorded;
 - allocation of the fund level NAVs to individual investors;
 - preparation and distribution to investors of statements that detail their current NAV and other related financial data.
 4. Should implement a process to produce its annual financial statements and related footnotes, which will be audited by the fund's independent accounting firm;
 5. Should implement an annual process to produce investor level tax information, as needed by investors, in accordance with the regulations promulgated by the relevant taxing authority;

6. Should periodically assess its operational controls in light of the changing needs of its business, particularly where there have been changes to the activities of the organization.

Responsibility for any outsourced parts of the process continues to lie with the senior management or its designees.

Many investors in the commodity industry, who are setting up some investment scheme to keep costs down and ensure institutional grade operational and legal infrastructure is in place from day one, utilize a fund platform.

A good example and reference point for hedge fund platforms is the firm Apex Fund Services, which is one of the world's largest independent fund administration companies with over \$40 billion of assets under administration, 36 offices and over 420 staff across the globe. Apex provides a full suite of products and services ranging from fund set up, portfolio valuations, fund accounting, shareholder services, directorships, and listing sponsorship. With its order management and portfolio management systems together with its middle office services Apex is a total fund solutions provider. This firm and others like it offer turnkey services for commodity investors and traders alike.

Disaster Recovery/Business Continuity

To mitigate financial loss in the event of a disaster or other business disruption, the trader should establish a comprehensive business continuity/disaster recovery plan. The plan should include a business impact analysis to identify and prioritize critical processes for the trader. It should also clearly articulate business recovery and resumption objectives. This plan may include written procedures and documentation, test plans and test scenarios as well as other procedures for addressing unforeseen events in an emergency.

Business continuity planning should cover all operational business functions and should not be limited to technology-based disaster recovery plans.

Record Keeping

Business records that are important to the trader and fund should be maintained. Examples include contracts, constituent documents, trade data, accounting records, documents relating to valuation, records of meetings of any principal committees (such as the risk, valuation, and conflicts committee), investor communications, and correspondence. The trader should estab-

lish policies and procedures for the creation, maintenance, and retention of business records that are appropriate to its size and level of activity. These policies and procedures should focus on key business records and should address, where applicable:

- the duration of retention, which may vary by type of record;
- the manner of retention, which should protect against unauthorized alteration or untimely destruction;
- communication of the retention policy to all employees as it applies to them;
- accurate and complete recording of trading activities;
- methods to access documents retained pursuant to the policy.

Annual Compliance Review

The trader's compliance framework, including compliance policies and procedures, should be reviewed at least annually to assess its effectiveness. A more frequent review of aspects of the compliance framework is appropriate upon the occurrence of events that necessitate more immediate changes. Each component of the compliance framework should be reviewed by the chief compliance officer in light of significant changes and factors relevant to the trader's business, such as:

- legislative and regulatory developments;
- changes in business practices;
- variations in the trader's strategies and products;
- the growth of the trader's business;
- employee conduct.

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