

RISKY BUSINESS

Companies that are heavy consumers of energy are particularly susceptible to market volatility. For such end-users, proper use of risk management techniques can mean make or break, says Eric Fishhaut of GlobalView



Free-market energy prices are among the most volatile of all commodities, encouraging consumers to find ways of protecting their budgets. Risk management – involving hedging with derivatives, such as futures, options, over-the-counter (OTC) forwards and swaps – is becoming a critical means of reducing exposure to fluctuating market prices. When used prudently, derivatives are effective tools for isolating financial risk and reducing exposure to risk. Derivative contracts transfer price risk to those able and willing to bear it, allowing businesses to stabilise costs.

There is substantial evidence that using an active risk management programme not only provides direct cost-control benefits, but also tends to increase company market valuation due to the ‘hedging premium’. There are those who do not believe that hedging ultimately saves on fuel bills. And from an end-user perspective, derivatives often carry a negative impression as they have been associated with spectacular financial failures of banks and energy companies with unconventional trading practices. There are usually questions as to whether the benefits derivatives offer are sufficient to offset their occasional, but possibly inevitable, misuse. But when studied, the

successes far outnumber the failures. Derivatives can provide great benefits when used properly, managing the inherent risk of energy commodities in an increasingly volatile marketplace.

The risk factor

Five general types of risk face all businesses: market risk, including unexpected changes in interest rates, exchange rates or commodity prices; credit/default risk; operational risk, covering equipment failure and fraud; liquidity risk, meaning the inability to buy or sell commodities at quoted prices; and political risk as a result of new regulation and expropriation. Businesses that are consumers in the petroleum, natural gas and electricity markets are particularly susceptible to market risk – specifically, price risk – as a consequence of the extreme volatility of energy commodity prices.

Proper use of risk management techniques can help protect budgets, secure margins, gain competitive advantage and maintain profitability. Several things can happen to businesses that do not manage commodity risks, including, but not limited to, negative margin impact, missed opportunities, poor asset utilisation and

reduced competitiveness. Not using risk management and taking no action to limit commodity price risk exposure is itself a large risk, and effectively speculation.

Making an analysis

The first step is to understand and quantify the energy risk inherent in your business. Analysis of annual commodity requirements, using past actual and future projections, forms the basis of a programme by measuring the extent of exposure. The overriding objective of a risk management programme is to reduce the potential impact of price volatility and lock in margins. Formulating a plan requires careful consideration of needs rather than deliberation of potential market price movements. The risk management programme should have a well-defined strategy that includes boundaries for contracts, a budget for capital outlay along with upper and lower price limits, a management process and reporting requirements.

While commodity trading involves risk, with risk management you are minimising your price risk exposure. Derivatives allow businesses to transfer risk to others who could profit from taking it on. The entity transferring risk gains price certainty but loses the opportunity for making additional profits when prices move in its favour. Like insurance, derivatives protect against adverse price conditions.

For end-user examples, we can examine transportation companies that consume fuel and for which the cost can represent a substantial portion of operating expenses. For airlines, fuel costs measured as high as 35% during the third quarter of 2008 and have fallen back below labour costs to 21% for the first quarter of 2009. Cost ratios for trucking last year rose to a point where the only defence against falling profits was to levy a fuel surcharge to customers. The key objective of consumer hedging programmes is the minimisation of the variance of the commodity price exposures over a given horizon.

A fuel cost hedging programme may be implemented by using a combination of physical storage and futures contracts. The plan will face several challenges, including commodity price and volume uncertainty, liquidity of futures contracts of increasing tenor, volatility of futures contracts of decreasing tenor that need to be rolled over, and exposure to basis risk when liquid futures contracts



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for the fuel of interest do not exist. Analytical modelling, pricing and control techniques are critical in managing the resulting dynamic optimisation problem. It is essential that reliable and accurate market price data be utilised within formulation and monitoring systems.

A case in point

First, a simple hedging illustration for a trucking company that requires a fairly consistent volume of fuel monthly. On March 3, the cash market price of diesel fuel is \$1.10 a gallon, exclusive of taxes, a negative 5¢ differential, or basis, to the prevailing Nymex New York Harbour heating oil futures front-month price of \$1.15. A trucking company contracts to buy 168,000 gallons of diesel fuel in June (three months forward) at the then prevailing futures price minus 5¢ per gallon. At the same time, it buys one June expiration heating oil contract (42,000 gallons each) at \$1.18 cents. The total cost is \$49,560. If futures prices are unchanged at the time delivery is taken, the fuel cost will be \$1.10 per gallon.

In the face of a rising price scenario, on May 29 the company buys the June fuel allotment of 42,000 gallons in the cash market for \$1.25 per gallon, 5¢ below the New York Harbour heating oil futures quotation of \$1.30. The total cost is \$52,500. It then sells the futures contract for \$1.30, realising a profit of \$.12 per gallon for a total of \$5,040. This makes a net cost of fuel at \$1.13. In the alternative falling price scenario, the company buys its June fuel allotment at a cash market price of \$1.00, 5¢ less than the New York Harbour heating oil futures quotation of \$1.05, at a total cost of \$42,000. It then sells the futures contract for \$44,100, realising a loss of \$5,460

The lowdown on derivatives

For consumers, or end-users, the most commonly used derivative contracts are forward contracts, futures, options and swaps.

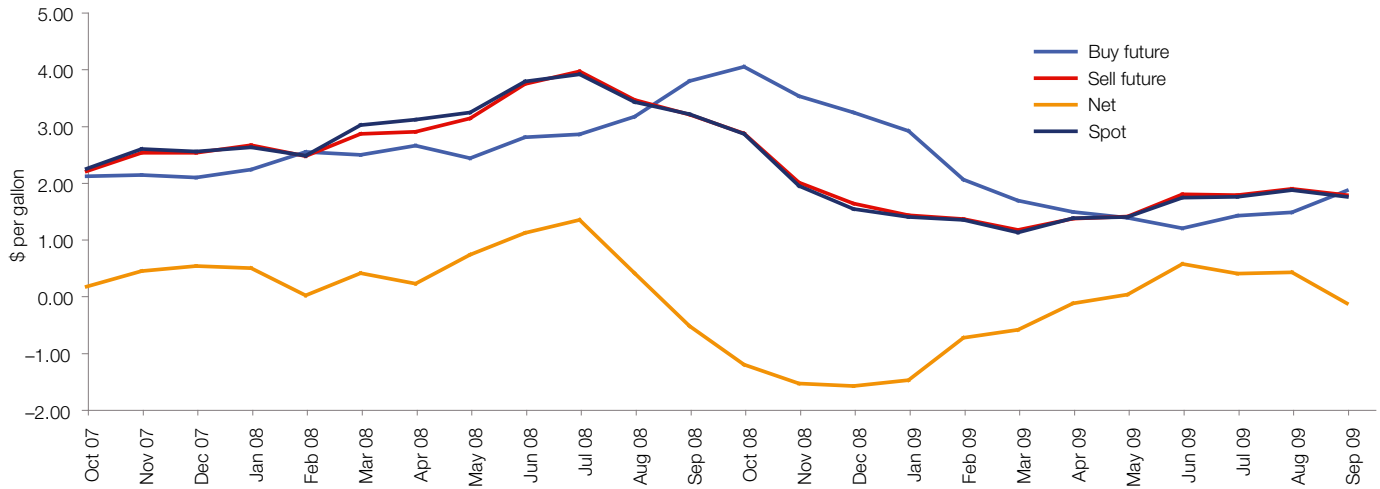
- **A forward contract** is an agreement between two parties to buy (sell) a specified quality and quantity of a commodity at an agreed date in the future, at a fixed price or at a price determined by formula at the time of delivery to the location specified in the contract. Forward price formulas typically include floors, ceilings, and/or inflation escalators. Forward contracts have potential pitfalls and require finding suitable counterparties. Parties can default, and when circumstances change, renegotiation can incur high costs.
- **Futures contracts** mitigate some of these issues but have some problems of their own. While obligating each party to the contract to buy or sell a specific amount of the commodity at a fixed price, transactions are handled by an exchange that is typically regulated and provides clearing.
- **Options** are contracts that give the buyer the right to buy (a call) or

sell (a put) at a specified price (strike price) for a specific period of time. American options allow the buyer to exercise his or her right to buy or sell at any time until the option expires, while European options can only be exercised at maturity. The buyer pays up-front for the contract in the form of a premium that reflects the valuation based on the current market price of the commodity. Options are used successfully to put floors and ceilings on prices. However, they tend to be expensive.

- **Swaps**, a recent innovation, provide a way to fix the price of energy to be purchased or sold in the future. They are exchanges between two parties where one agrees to swap a fixed price for a floating one, thereby exchanging a series of cashflows generated by underlying assets while no physical commodities are actually transferred. Since swaps do not transfer assets, they are based on the periodic 'notional amount' of the contract. These instruments are well-suited to customisation, making them attractive to end-users with unique circumstance. Swaps are an OTC derivative that can incur greater credit risk as they are not always guaranteed via a clearing house and are typically less liquid,

F1. Heating oil futures hedge – two years

Illustration of Nymex heating oil hedge buying the third-month contract three months prior to expiry and selling at expiry. The net calculation shows the effect of the futures position and purchase in cash market. Over this period, the hedge positions nets a savings of 4.4 cents per gallon per month *Source: Nymex and Platts*



or \$.13 per gallon. Combining the loss with the actual cost of the fuel yields a net cost of \$1.13 per gallon. For a relatively small premium of \$0.03, the net cost of the required fuel works out the same whether the market price rises or falls. Figure 1 illustrates a two-year simple physical and futures strategy.

A somewhat more complex illustration is of an airline using a dynamic hedging strategy based on the premise of a mean reverting oil price cycle. The strategy varies the products over that cycle. When the cycle is at a low point and further declines seem less probable than increases, swap contracts are used to lock in the relatively low price. When in the middle of the cycle, futures and option collars are used to lock in a price range similar to the previous example. When prices are near the top of the cycle, caps – agreements to purchase defined

quantities of fuel from a party at a price not to exceed a defined price – are used to prevent losses from further increases while still taking advantage of eventual decreases. As each stage of the strategy is entered, the optimal hedge ratio will take into account the correlation between jet fuel and crude oil (shown in figure 2) and the difference in their volatilities, as well as the current basis between them. A strategy with this level of sophistication requires considerable monitoring. However, more than one US airline has proven it can be successful and managed to show overall operating profit due to hedging while competitors with little or no programme experienced substantial losses. ■

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F2. Correlation of crude oil and jet kerosene

Comparing WTI crude oil futures with spot market jet kerosene yields a reasonably high correlation of over 90% *Source: Nymex and Platts*

