



# Catching a Falling Knife:

## Hedging in a period of extreme market movements

*By Bryant Lee*

It's no secret that the global energy markets have imploded over the past six months with prices of crude oil reaching levels not seen since the crash of 2009. End-users that executed long-dated hedges in late 2013 and early 2014 have seen the value of their hedges drop precipitously, resulting in painfully expensive margin calls.

**A**t Chatham we receive calls on a daily basis from our corporate clients with new concerns about their positions, their balance sheets, the profit and loss impacts from hedging and the potential for margin calls. Clients are considering the full breadth of options: unwinding their hedges, increasing their hedge ratios or rotating into different instruments and indices. Some end-users are even questioning the value of their hedging program and whether they should remain in such programs.

In the 15 years that I have been working with clients on hedging programs, the costs and benefits of hedging have always been part of the discussion, but the current period of market volatility has raised this issue to the highest levels. Management teams are being pressed by investors and board members to defend the value of hedging programs and internal disagreements are burgeoning at the highest levels over the prudence and effectiveness of risk protection when oil prices have plunged so far so fast.

What has made the most recent market shock especially challenging for end-users is that the forward curve shifted from backwardation to contango, with the front month prices falling the most. This type of structural shift occurs very infrequently and has made the hedge portfolios of most consumers extremely unfavorable as the periods with the highest hedge volumes experienced the largest price drops.

Compounding these challenges, many of these end-users were also caught in the price run up in 2008 that saw energy prices nearly

triple over an 18-month period, only to abruptly reverse and fall to a four-year low. That amount of volatility can wreak havoc with the costs of a hedging program. For example, US Airways hedged aggressively in 2007 and 2008 as oil prices moved steadily higher and was nearly bankrupted when the price drop occurred. The liquidity strain and financial impact of those price swings was material enough to convince US Airways to discontinue all hedging activity and ride the market rather than trying to predict future market movements.

Turbulent markets demand that all prudent risk management organizations rethink their approach to hedging. In light of these market movements, commercial end-users should revisit how to structure a hedging program to protect the bottom line while not exposing the company to expensive margin calls.

### **Hedging: The Value Proposition**

Hedging programs are designed to smooth the peaks and valleys of market movements and stabilize earnings. They are not intended to “beat the market” or capture the lowest price. A hedging program should be executed programmatically, using an established cadence that layers in volumes at relatively set tenors with a focus on a budget price target that supports profitable operations. Once set, hedges are generally held through maturity, ideally offsetting price fluctuations of an associated purchase or sale. This approach is designed to reduce the amount of decision making related to evaluating and predicting future market price movements.

To achieve the desired effect of dampening market swings, hedges are generally set fairly far in advance, using long dated tenors. Transactions executed 18 to 24 months into the future are not uncommon. Likewise, hedge ratios tend to rise as the delivery period gets closer. For instance, an airline might hedge 60% of forecasted 2015 consumption but only 25% of its 2016 requirements.

In a relatively stable market, swaps are often used by end-users to hedge exposure. Swaps fix the price of a commodity to be purchased at some point in the future but do not require any upfront payments. If the market falls, the swap buyer pays out on the hedge, but also pays less for the offsetting commodity purchase.

Options are an alternative to swaps. In exchange for an upfront payment, they give the option buyer the right, but not the obligation, to buy or sell at a fixed price in the future. In today's unstable oil price environment, options are expensive but may be preferable to swaps because there is less exposure to loss if prices continue falling. Accordingly, many end-users are opting to buy calls when layering on additional protection despite the fact that option prices have risen considerably over the past several months. These calls will provide protection should oil prices rise, but allow the call buyer the benefit from lower costs on physical purchases in case of any further price drops.

### Structured Policies and Analysis: Keys to Effective Hedging Programs

Risk management policies normally dictate the instruments, tenors, underlying indices and hedge ratios or volumes that will compose the hedge portfolio. Purchased options can provide a level of protection and preclude margin calls and should be blended with swaps and sold options to provide an optimal level of protection that uses a mix of cash and counterparty credit and limits margin call exposure.

Commodity hedging programs must also address the issue of basis and hedging index. The hedge must have a degree of correlation to the underlying exposure or it will not effectively mitigate the risk. For example, many airlines hedge jet fuel exposure with Brent due to the limited liquidity in long term jet fuel hedges. However, a Brent hedge will not offset the price increases that occur when a supply disruption occurs in a localized market. For example, in 2012 a fire at Chevron's Richmond refinery in California sent prompt LA jet fuel prices up 30 cents in a matter of hours, while Brent was unchanged. It is important that the policy and program have sufficient flexibility in approved indices to match the risk exposure.

The question then becomes what combination of products, tenors and volumes should be utilized to minimize the risk, maintain the largest amount of upside or downside opportunity, and optimize the use of cash and available counterparty credit. Solving this problem begins with a statistical analysis of current market conditions to develop a distribution of potential future prices, and then applying those prices to forecasted volumes to create a range of expected commodity expenses or revenues. These values are then balanced against the financial requirements of the enterprise and the ability to pass price changes through to customers. If the potential change in revenue or expense exceeds the tolerance or ability to absorb the variance, the amount of the exposure must be reduced. In cases where the price changes can be passed through, the amount



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of risk mitigation required is reduced but must still account for the lag between a market price shock and the time when price changes can be passed through to customers.

Having determined the maximum allowable exposure, the next step is to structure a blend of derivatives that will reduce the risk below the tolerance. Starting with the current market price and the maximum expected price change, a blend of swaps, options and fixed price physical purchases should be structured such that the weighted average strike price, including the price on any unhedged volumes is less than the maximum or minimum allowable price.

For example, a trucking company that is exposed to rising prices has a fuel target of \$2.75, and expects that 2015 prices will be no lower than \$1.85 and no higher than \$4.25. The firm can meet its profitability targets with a fuel price up to \$3.20, so using a blend of 50% swaps, 25% \$3.00 call options and 25% floating price should yield an actual price between \$2.30 and \$3.18. The potential variance is now below the threshold.

### Credit Diligence and Tenor

The portfolio now needs to be tested for counterparty credit exposure, credit line adequacy and potential margin calls risk. This test is done by utilizing the same expected price distributions and valuing the portfolio against the best and worst case scenario. In the best case scenario where hedges are deep in the money, the critical question is whether there is an over-weighted volume of hedges with any one counterparty such that a default would leave the company overly exposed. It is important to remember that most defaults occur during periods of extreme market stress, when hedges are most valuable. Conversely, in the worst case scenario, the critical question is whether there is a concentration of hedges with any one counterparty, or collectively the sum of the hedges, that exceeds

the available counterparty credit. If there is a high concentration of hedges with one counterparty and the market moves, the hedger could be required to post significant margin calls.

In analyzing the portfolio and the overall commodity exposure, it is very important to use the correct holding period. When considering how much the value of a trading portfolio can change over a certain time horizon (holding period), it is common to use the amount of time that would be required to unwind the existing book of trades, which is usually just a few days. In a hedge portfolio, however, the intent is to hold the hedges from inception through maturity. Calculating the maximum expected change should consider the entire time the hedges will be held. This will result in a far larger variance than a two or three day holding period and is a critical aspect of the portfolio testing process.

## Stress and Risk Analysis

The last step to optimizing a hedging plan is the stress test and tail analysis. Generally, the risk analysis will be based on a two standard deviation move in prices based on the historical price distribution. These values represent a reasonable expectation of future prices. The most recent market activity is well outside the two standard deviation move and typifies “tail” risk, or the risk that prices could move well beyond the expected change and into the tails of the distribution.

There have been a number of articles published recently about oil producers that used what is known as a three-way collar to hedge their exposure to falling prices. A standard collar limits price risk by combining two options positions—the purchase of a put and the sale of a call. The long put provides the right to sell at a fixed price at some point in the future, which effectively sets a floor on the amount of risk from falling prices, while the short call position creates an obligation to sell a price above the market, which effectively sets a ceiling on possible gains from rising prices. With this structure, the oil producer has created a “collar” around future prices whereby he will sell his oil for no more than the strike price on the call and no less than the strike price on the put. In other words, the producer offsets the cost of buying downside protection by giving up the opportunity to participate in the upside above a certain level.

A three-way collar adds a short put executed at a lower strike price. This further reduces the cost of the hedge and in some cases may generate income, but it creates the risk of loss if prices fall through the strike price of the short put. In many cases, producers sold this additional put on the assumption that even if prices fell below the floor of the collar, they would not reach the level of the sold put. Generally, this was a good strategy during the last two years, when prices were relatively stable, but the current environment has exposed the risk of this strategy. With the collapse of oil prices, the long put (the right to sell) and short put (the obligation to buy) offset each other and the oil producer is unhedged in a falling market with his hedge profit and loss limited to the difference between the two put strikes. A good stress test using extreme but reasonable price shocks based on past market history, such as the price shocks of 2008, would have identified the potential exposure in a three-way collar.

Once the hedge program is developed, it should be implemented using a set plan of targeted price entry points for both a rising and falling market. If downside exposure is a major consideration, hedges should have pre-set stop losses, although stop losses should be placed

with consideration for market reversals. Stopping out and then resetting a hedge when the market reverses can add significant cost to the hedging program. It is important to regularly update the price distributions. Risk is a function of volatility, increasing with the amplitude of daily price swings. A market going up or down by a penny or two a day is far less risky than a market swinging by 8 or 9 cents a day. As the amplitude of price swings increases, risk increases so the distributions should be recalculated as the hedge ratio may need to be increased or decreased as the market becomes more or less risky.

## Mission Drift

The last key element is constant monitoring and maintenance. As we have recently seen with the oil market, a pattern of price behavior can exist for several years and then suddenly break away into a different price range. Once a change to the pattern appears, a hedging strategy must be re-evaluated. For example, given the uncertainty surrounding the medium-term outlook for energy prices, many consumer-side end-users have shifted away from swaps and into purchased options. This transition helps provide protection against higher prices but also preserves the potential benefit from falling prices and mitigates the exposure to margin calls.

It is important, however, to remain focused on the long-term goal and avoid speculating on the direction of prices. Many companies that have hedging programs frequently look at the market-to-market value of their hedge portfolios on a stand-alone basis, and not as a part of a larger commodity spend or revenue stream. Additionally, in unstable environments like the current oil market, companies exposed to price volatility tend to lose their hedging discipline and execute transactions based on a guess of where prices will be in the future. This behavior is counter-intuitive to the objective of hedging, which is to remove the uncertainty of future market prices and focus on core business.

For example, Continental Resources, a large domestic oil and gas producer, opted to monetize its hedges in early November, when oil prices were around \$83 per barrel. The company assumed that prices would not fall any farther and the downside protection would not be needed. The company recorded a one-time gain of \$433 million on the sale of its positions, but just a few weeks later, OPEC announced there would not be a production cut and prices dropped significantly, taking Continental’s stock price along for the ride. Continental’s decision may be born out in the long run, but in the meantime the company’s financial results will hinge on the ups and downs of the oil market, creating considerable uncertainty for management and shareholders.

Making hedging decisions based on assumptions about how far the market will fall and when it has hit bottom, as opposed to a rigorous focus on limiting risk in all scenarios, quickly moves a company out of the world of risk management and into the world of speculative trader. While there certainly are many professional traders who thrive in that world, most commercial end-users are not set up for that purpose and are better off hedging market risk and concentrating on their core business. ■

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