Lake Hill Crude Oil Market Update

Oil markets are experiencing forced hedging, unwinds and de-risking by both producers and consumers, exacerbating the recent spike in volatility. This distressed trading activity has created both opportunity and risk.

Current oil market volatility and uncertainty is more extreme than in 2008. Oil began its descent in June 2014 with the Oil VIX (Ticker: OVX) near a multi-decade low of 14%. The sell-off accelerated through year-end with oil dropping 10% in one day during the November OPEC meeting. By then the OVX reached 36% and eventually peaked at 64% in early February.

The chart below illustrates the price erosion and the choppy trading that followed.

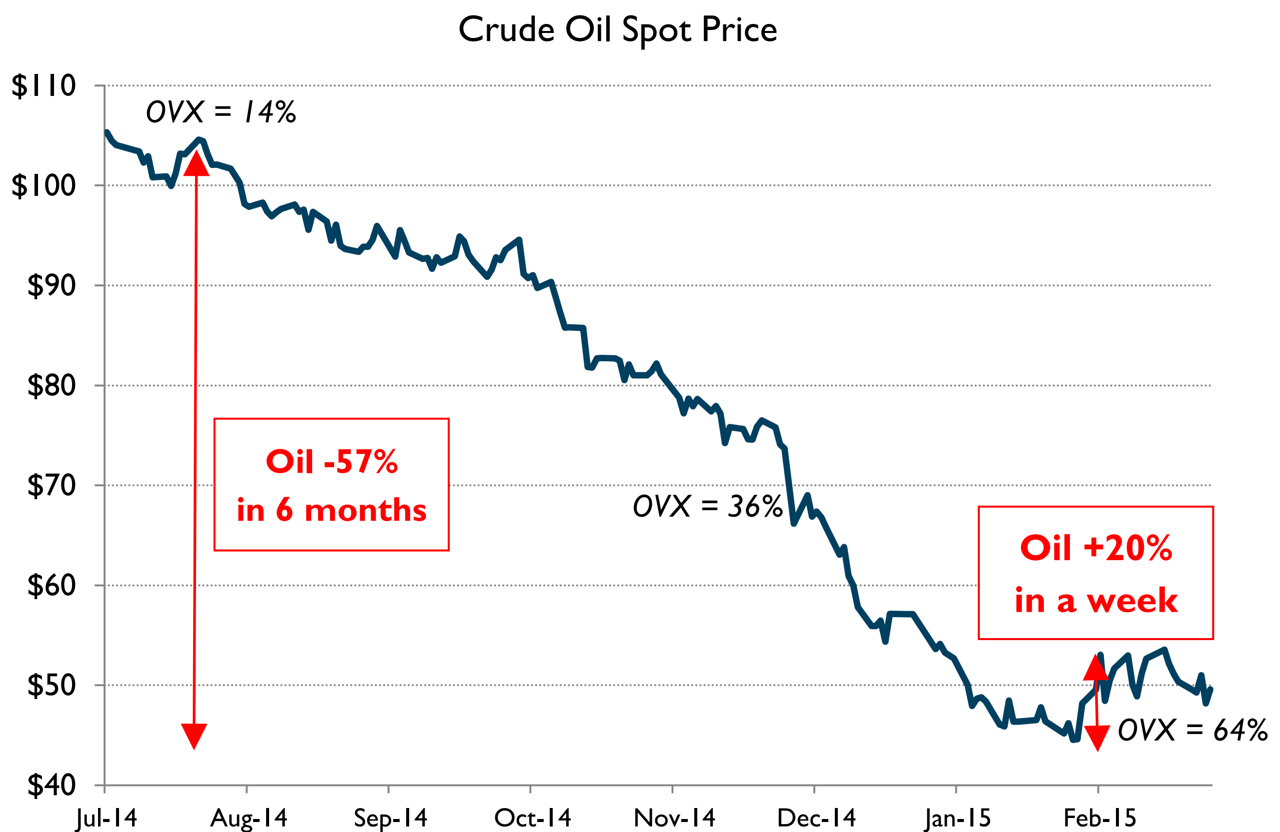

Figure 1: Spot prices of Light Sweet Crude Oil (WTI) from July 2014 to the present.

Using option prices from the past two decades, we see a dramatic shift from calm to panic toward the end of 2014. As the following figure illustrates, the violent swing in option premiums was twice as high as it was in 2008.

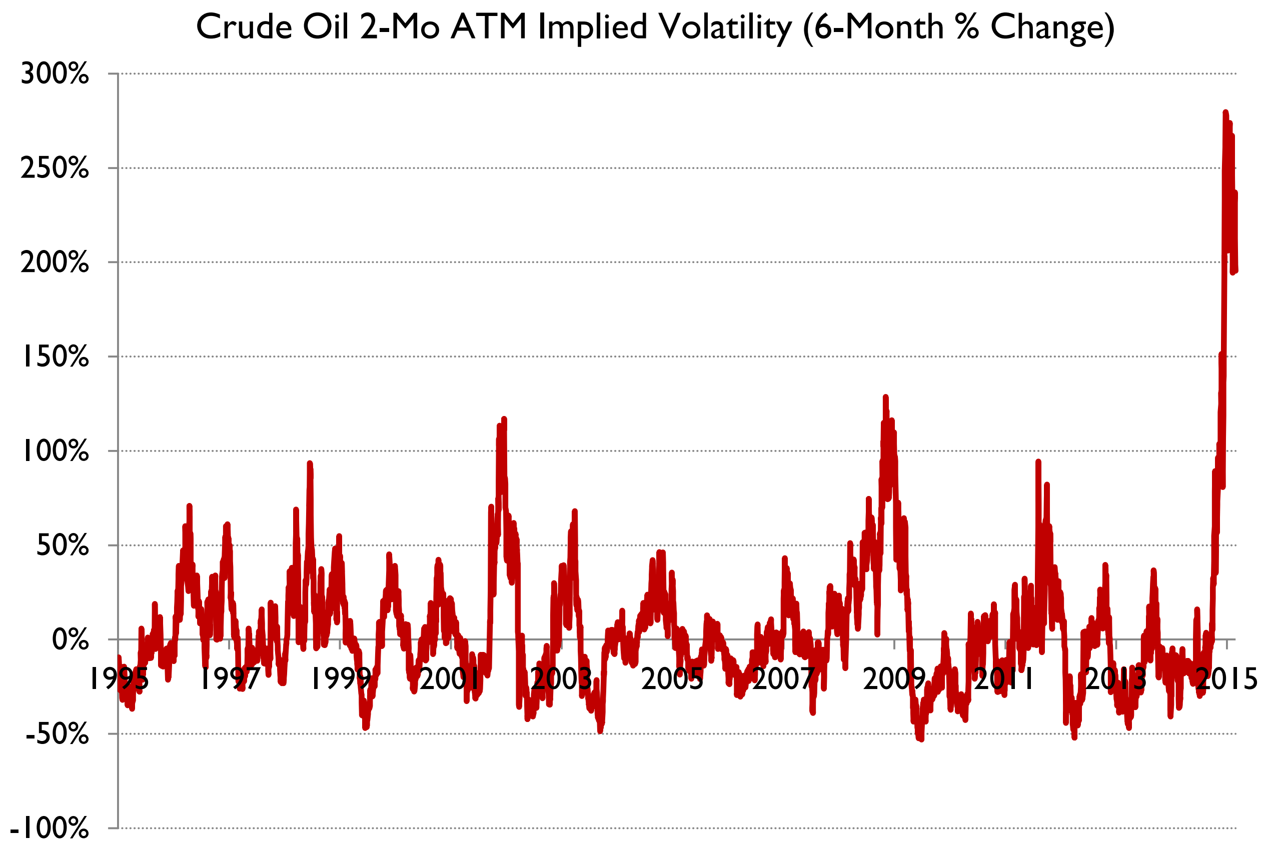

Figure 2: Rolling 6-month percent change in 2-month crude oil at-the-money implied volatility.

In recent years, hedging oil through listed options has become increasingly popular. This hedging demand by both oil consumers (such as airlines) and oil producers has created a significant amount of short option exposure in the oil markets. When both consumers and producers were forced to reduce risk, they bought back the same optionality.

In other words, bona fide hedgers protecting against rising OR falling oil prices were scrambling to cover the same thing!

How can this be?

Many consumers of oil, including large airlines such as Delta and Southwest, lost billions in oil hedges even though they "want" lower oil prices.[1] Airline profits are negatively impacted when fuel prices go up. They look for ways to hedge against higher prices using options and futures. In many cases, they will sell puts to finance the purchase of call spreads.

If oil rises, these structures will generate positive P/L to the airline. If oil prices drop, they get longer oil and the hedge loses. In order to reduce the additional long exposure to oil as the commodity falls, they are forced to sell futures or buy back the short put positions.

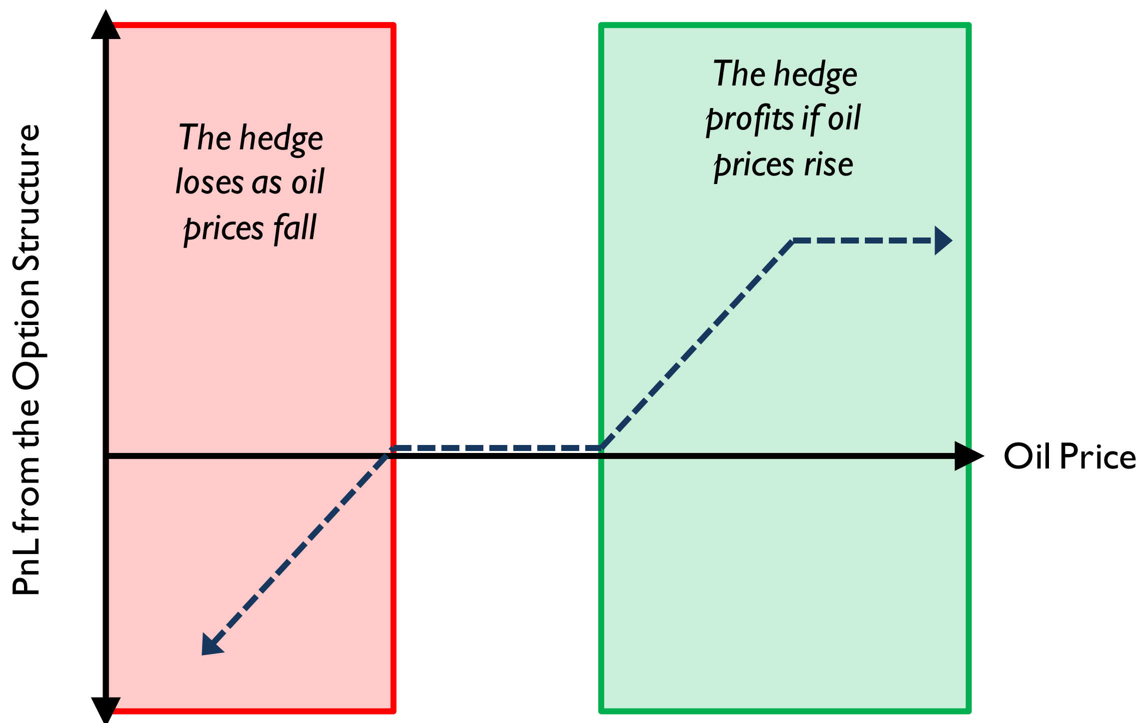

Figure 3: Payoff profile of a theoretical oil hedge for a consumer that combines a short put with a long call spread.

Conversely, oil producers benefit from higher oil prices. To insure against falling prices, producers can hedge using options. Some producers sell calls to finance the purchase of put spreads, which generate positive P/L during a sell-off.

The issue is that profits from these hedges are capped by the strikes selected. For instance, if oil is at $100 and the producer is long the $90 puts and short the $80 puts, the insurance only

[1] http://www.reuters.com/article/2014/12/23/us-oil-hedging-airlines-idUSKBN0K10AJ20141223

covers them for the $10 between the two strikes. The oil sell-off gapped below the short put strikes of many producers, forcing them to buy back put options at higher prices to maintain their insurance on the downside.

The figure below illustrates a sample hedge where the producer is only insured up to a certain level.

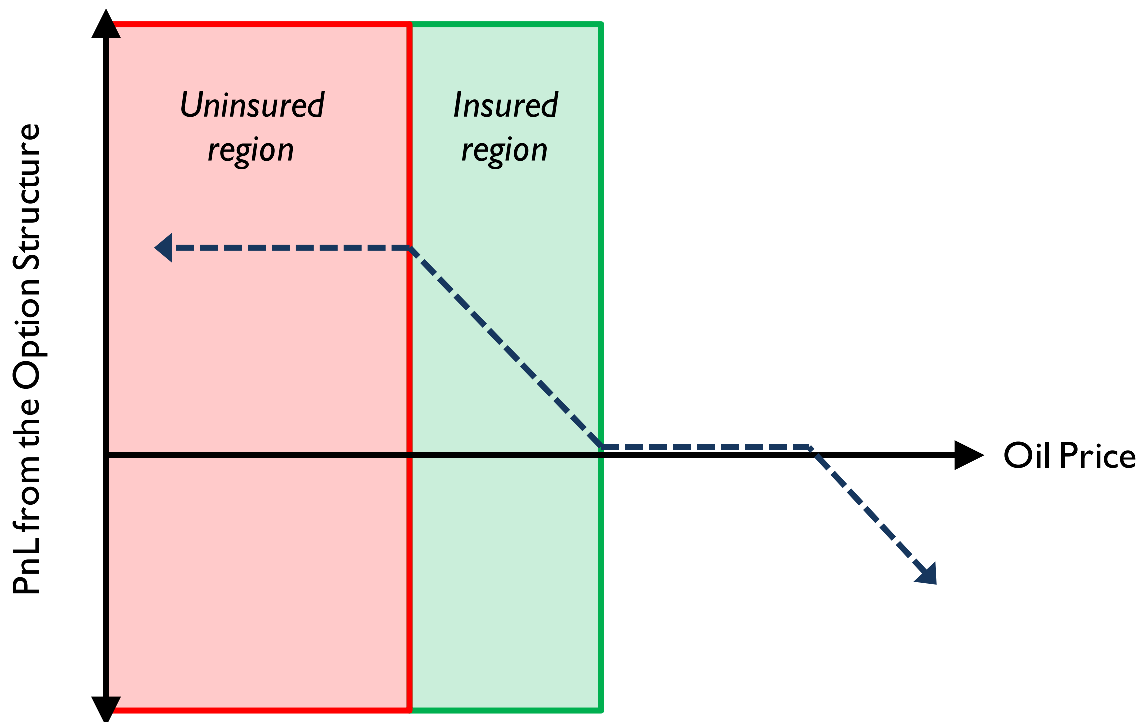

Figure 4: Payoff profile of a theoretical oil hedge for a producer that combines a long put spread with a short call.

Both oil consumers and producers appeared to be net buyers of the <u>same</u> puts during the sell-off.

This activity drove option prices and option "skew" (a measure of the relationship between downside put prices with upside call prices) to extreme levels. We believe this structural demand influenced oil prices by putting additional pressure on the futures and options markets.

Figure 5: Light Sweet Crude Oil (WTI) 2-month implied volatility skew calculated by taking the 90% implied volatility less the 110% implied volatility.

The recent extreme behavior is a result of panic trading across oil options and futures. Consumers and producers are impacting markets as they unwind existing hedges and construct new ones. The increased trading activity creates both opportunity and risk for liquidity providers and other market participants.

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