Intuition Learning Insights

Issue 4, 2018

Option Hedging in the Oil Market

With the price of West Texas Intermediate (WTI) oil now at its highest level ($74.14) since November 2014, many corporates are becoming increasingly nervous about further gains eroding their company profits. Airlines, shipping companies, and other transportation companies are all at the mercy of OPEC's continued attempt to drive the oil price higher.

In the graph, it can be seen that the current WTI price is at the top of a perfect trend channel. So, in the short term, we would expect a technical retracement lower, but the longer-term trend is clearly higher.

US WTI Oil Price Per Barrel

Source: Bloomberg

Options are a way corporate companies can hedge against further gains in the oil price and are effectively a form of insurance. Oil derivatives account for 47% of all commodity derivatives (on gold, silver, natural gas, lumber, grains, electricity, carbon emissions, and so on), but only 7% of oil contracts are actually traded by 'hedging' companies. Amazingly, the other 93% of oil derivatives are traded by 'speculators.'

An option is a right (but not an obligation) to buy (call) or sell (put) an underlying asset at an agreed price on (European option) or before (American option) a certain date, known as the expiration date. The option buyer purchases the option from the option writer who assumes the market risk.

A European option is typically priced using the Black-Scholes model with the necessary inputs being; the price of the underlying asset, the strike price, the option expiration date, the risk-free rate, and the volatility of returns on the underlying asset. Of course, historical volatility typically differs from future volatility, so actual options prices will deviate slightly from those predicted by the Black-Scholes model.

A corporate hedger may decide to buy protection against a rise above $100 per barrel in the oil price. With the current WTI price at $74.14 per barrel the corporate can buy a European call option with a strike price at $100 per barrel in 6 months' time, paying a premium of $0.41. This can be seen from the screenshot on the next page.

WTI 6-Month $100 Strike Call Option Valuation

OVML USCRWTIC EU 100.00C 01/07/19 N1

Strategy 1

Leg 1

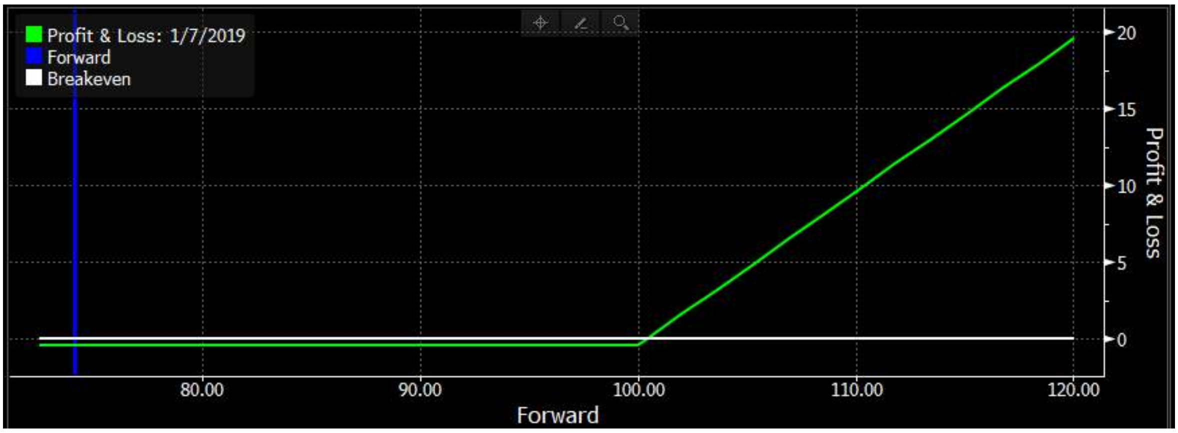
Price Date	07/05/18	12:20
Asset	USCRWTIC	
Product	Bloomberg West Texas Intermediate	
Source	Contributor Ave	Edit
Quote	USD	
Style	European	Vanilla
Direction	Client buys	Physical
Call/Put	Call	
Expiry	6 months	01/07/19
Delivery	01/07/19	
Strike	100.00	34.88% OTMF
Unit barrel	1.00	
Converted	barrel	1.00
Model	Black	
Results		
Price	0.412 P	
Premium USD	0.41 P	
Prem Date	07/05/18	
Delta	7.0371%	
Sticky Delta	5.2313%	
Hedge	-0.07	

Source: Bloomberg

If the underlying WTI price at expiration is above the sum of the strike price and the premium paid (a sum of $100.41 per barrel), then the difference represents a profit to the option holder; if the underlying price is below the aforementioned sum, the option holder will not exercise the option (and will effectively incur a loss equal to the premium).

Of course, the potential profit for the option buyer (and potential loss for the option writer) is unlimited as the oil price rises, as can be seen from the right-hand part of the green line in the screenshot below. Therefore, option writers run trading books that are monitored around the clock and hedged regularly.

Profit & loss Payoff Structure for the Option Buyer



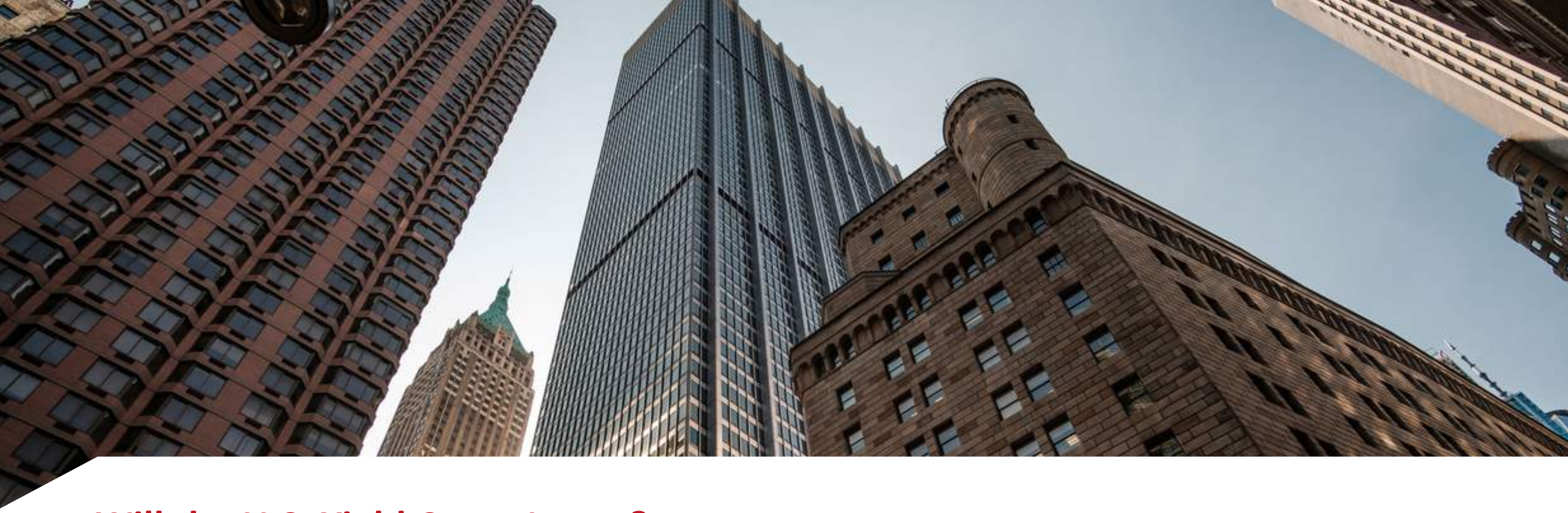
Source: Bloomberg

Know-How

The Intuition *Know-How* library contains several tutorials related to this article:

Options

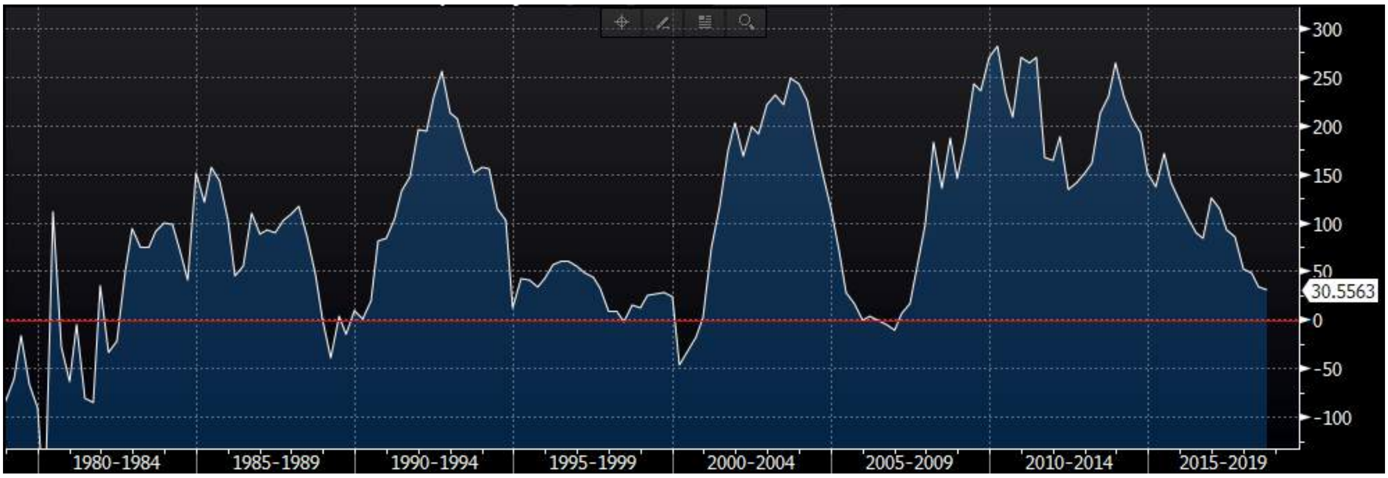
- Option Valuation – An Introduction
- Option Valuation – Key Concepts
- Option Valuation – Sensitivities & Outcomes
- Option Valuation – Future Asset Prices & Volatility
- Option Valuation – Black-Scholes-Merton
- Option Valuation – American Options
- Option Valuation – Binomial Techniques
- Option Valuation – Monte Carlo Methods



Will the U.S. Yield Curve Invert?

There are growing concerns within the financial markets that the US yield curve will soon invert, meaning that the 2-year Treasury yield will be higher than the yield on the benchmark 10-year Treasury note. This makes market participants, economists, and even CEOs of industries further afield very nervous because every time the US 2-year/10-year yield curve spread has inverted over the last 40 years, there has been a recession.

US 2-year/10-year Government Bond Spread



Source: Bloomberg

At the start of 2014, the 10-year Treasury note yielded a return of 265 basis points (+2.65%) above its 2-year equivalent. However, since then the US economy has strengthened and the Federal Reserve (the Fed) has been raising interest rates from an overnight average rate of 0.10% to the current 1.91% level. This has pushed the short-end of the US yield curve higher; the Fed has also hinted that it will raise interest rates another 50 basis points this year.

But while the short-end has risen, further out the curve the 10-year yield has remained relatively static, currently yielding 2.83%. Longer-term yields are not affected so dramatically by the Fed's actions – they are more influenced by inflation and deflation expectations. Although there are signs of cost-push inflation slowly creeping into the economy (average hourly earnings data is starting to rise), demand-pull inflation remains subdued. This is due to intense price competition brought about by factors such as internet price wars – for example, Amazon undercutting its competitors – and the 'FinTech' revolution, among others.

The long end of the yield curve is also being held down by other current global macroeconomic factors and fears! Emerging markets, many of which have massive US dollar-denominated debt, are being crippled by the rising US dollar. The Argentinian central bank has had to raise the repo rate to 40% and prices of US dollar bonds issued by Chinese local governments have collapsed in recent weeks. Even spreads in US non-investment grade bonds have recently jumped 50 basis points.

The chart of the iShares emerging market equity ETF highlights just how much the emerging market equities have fallen. The bear market is clearly trending lower.

iShares Emerging Market ETF

Source: Bloomberg

Donald Trump's mission on tariffs and a possible full-blown trade war are also raising fears of a more severe equity correction which would further invert the yield curve and bring forward a recession. Finally, political tensions are rising again in Europe with Angela Merkel's grip on power in Germany now looking more fragile than ever.

It's hard to see the US yield curve steepening at the moment. Fears of a recession are growing!

Know-How

The Intuition *Know-How* library contains several tutorials related to this article:

Fixed Income Analysis

- Excel Interactive – Bond Prices & Yields
- Excel Interactive – Yield Curves
- Zero-Coupon Securities
- Duration Analysis
- Convexity Analysis

Exchange-Traded Funds (ETFs)

- Exchange-Traded Funds (ETFs) - An Introduction
- Exchange-Traded Funds (ETFs) - Types
- Smart Beta - Primer

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