OTS04: Lecture Summary

Overview

This document summarises the OTS-04 lecture on structuring a volatility trade. The lecture discusses volatility trading, why volatility premiums exist, the volatility premium in multiple asset classes, covered calls and how to select strikes and expirations to structure a volatility trade.

The following topics are covered -

- Volatility trading
- Volatility premium in equities, bonds and VIX
- What are covered calls?
- Term structure as a predictor
- Selling options over earnings
- Selecting strikes and expirations

Volatility trading

If realised volatility is not equal to implied volatility, we can trade the option, and replicate it in the underlying and profit. So, we need to find situations where we expect realised volatility to be different from the implied volatility.

An example

- We own the one-year 100 call on a $100 stock with a volatility of 30%.
- It is worth $11.92 and has a delta of 0.56, so we sell short 0.56 shares to hedge.
- Now the stock jumps to$110. The call is $18.14, and the delta increases to 0.68.
- So we need to sell 0.12 shares to stay hedged.
- At expiration, this process captures the difference between implied and realised volatilities.

Why does premium exist?

Insurance premium: Puts provide insurance against crashes. Calls provide insurance against FOMO.

Fear of atypical events: People overestimate the probability of an extreme event. Black swan events don't happen very often. This leads to overpricing of options.

Correlation risk: Diversification isn't effective during bad times.

Unpleasant risk profile: A short option portfolio has negative skewness, high kurtosis, high downside deviation and large drawdowns.

Skewness premium: Much of the short volatility premium comes from the short puts as the implied volatility of puts is higher than calls.

Volatility premium in equities

- On average, equities also display a volatility premium
- Some stocks have negative premium or no premium
- The highest premium is observed in small-cap stocks and value stocks.

Volatility premium in commodities

Here are some commodities in which a statistically significant volatility premium is observed: Crude oil, Heating oil, Natural gas, Corn, Sugar, Copper, Cocoa and Oats.

Volatility premium in bonds

- Volatility premium is about as persistent and as large (in percentage terms) as in indices.
- However, bond volatility is much lower (typically 3% to 6% instead of 10% to 30%). So, bond options have more gamma, and positions can get out of control quickly.

Volatility premium in VIX

Evidence of volatility premium is weaker as there's a shorter period to examine and only one liquid product.

Volatility premium in general

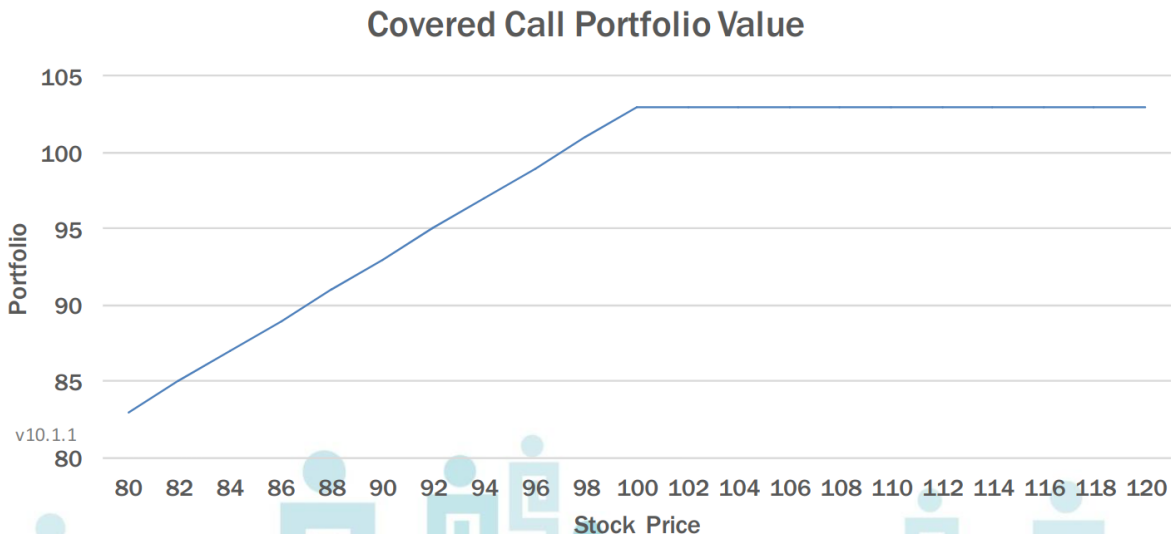
- Products with a significant and consistent implied skewness show investors' fear and also capture the skewness premium.
- Products with a significant and consistent term structure where front volatility is lower than back volatility.
- Sellers are compensated for risk and the level of compensation increases in times of uncertainty.

What are covered calls?

A covered call means buying a stock and selling a call.

Example - Buy stock and sell $100 for $3 premium.

The following snapshot shows the payoff diagram of a covered call.



- This is the same as a short put.
- This position is a long delta.
- You also benefit from collecting the variance premium.

Covered call performance

The following snapshot shows the performance of a covered call from 1988 - 2018.

Statistic	BXM	S&P 500
Annual Return	8.5%	7.7%
Volatility	12.6%	17.3%
Sharpe	0.57	0.34
Max Drawdown	40%	57%

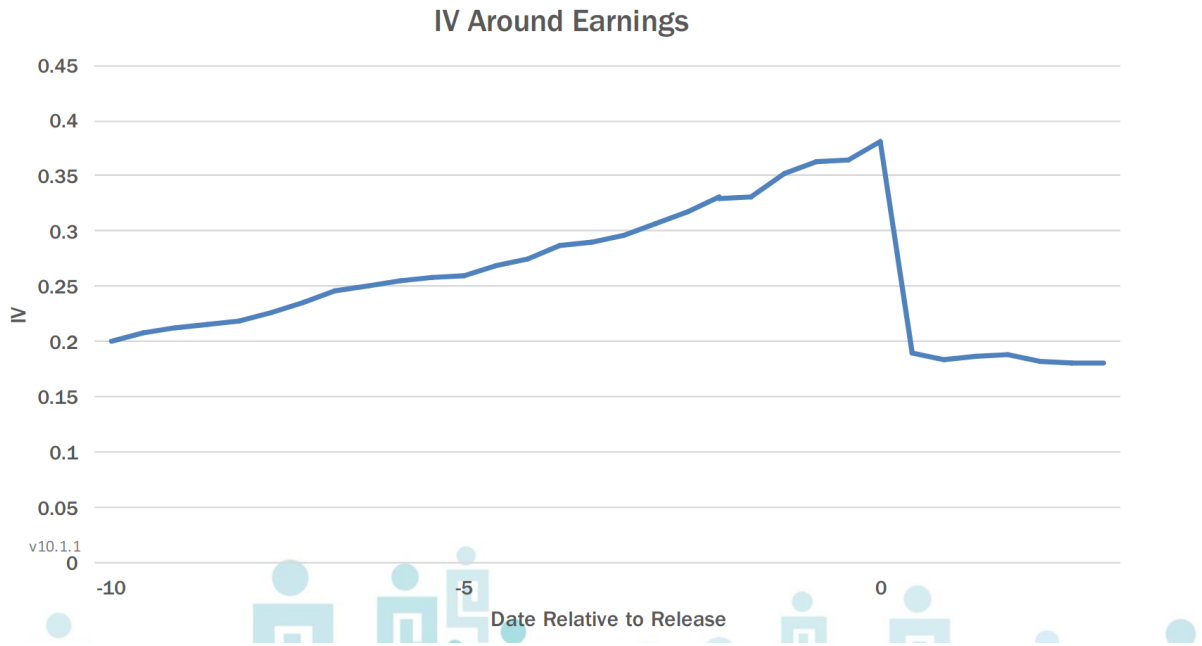
Term structure as a predictor

- Theoretically, futures prices don't contain future predictions, but in practice, they do.
- The basis converges to zero at expiration. Future price moves towards the cash, i.e. cash price is predictive.
- So, if back-month volatility is higher than front-month volatility, we expect implied volatility to drop over time as it merges towards the spot level.
- If term structure is in contango - sell volatility
- If the term structure is in backwardation - buy volatility

Selling options over earnings

- Implied volatility increases before earnings and then collapses when the news comes out.
- Price moves from earnings persist for weeks or months.

The following snapshot shows that the Implied volatility increases before earnings and then collapses when the news comes out.



- This IV pattern generally exists when the underlying has a source of uncertainty with a specific resolution date.
- For example -
    - S&P 500 - FOMC
    - Bonds - FOMC, inflation reports and employment reports
    - Oil - inventory releases
    - Agricultural commodities - crop reports

- Example trade -
    - Buy the straddle (that will be front expiration when the release comes out) 10 days before the news release.
    - Usually, the straddle price won't increase, but the IV rises at a rate so that vega profits offset theta decay.

Earning's induced reversals.

- Significant moves in the week before earnings tend to reverse.
- It seems that the stock price overpromises and under delivers.
- From 1996 to 2011, a long-short portfolio constructed on this basis earned 1.45% in the four pre-earning days.
- Even if you don't trade this on its own, be aware of it when doing other earnings trades.

Post Earnings Announcements Drift (PEAD)

- A stock that beats expectations and has a price move consistent with that result will have the drift continue over weeks and even months.
- Long short portfolios can beat the market by between 9 and 27%, depending on exact details.
- Probably the most studied and confirmed stock anomaly.
- Not entirely clear why the effect exists, but it helps with our post-earnings option trade exits.

Selecting an expiration

Short option positions will require selling low and buying high to hedge. That's why most of the premium is concentrated in the short-term options that have the most gamma.

Personal observations on executing trades

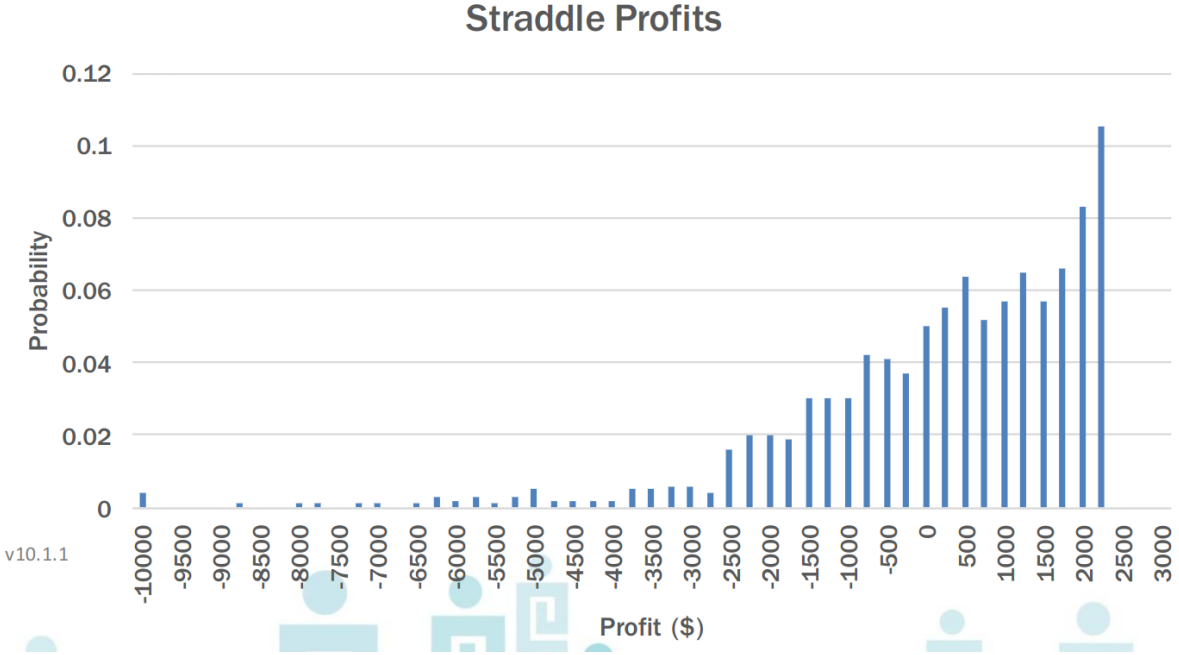
- The straddle will not expire at its intrinsic value.
- There will appear to be a time value left.
- The market closes, but the option holder still has time (generally a few hours) to decide to exercise.
- This time has optionality value.
- Suppose we are a long way from the strike it doesn't make sense to buy back the OTM part of the straddle. Instead, hedge with the stock assuming the ITM leg is 100 delta.

Personal observations on selecting strikes

- If you are hedging relatively often, strike choice is less critical.
- Your net Vega number is the driver of your P/L.
- Selling puts will collect the skew premium, but you probably want to sell calls to maintain vega exposure as the stock moves.
- But if you hedge infrequently, the exact option structure is more important.

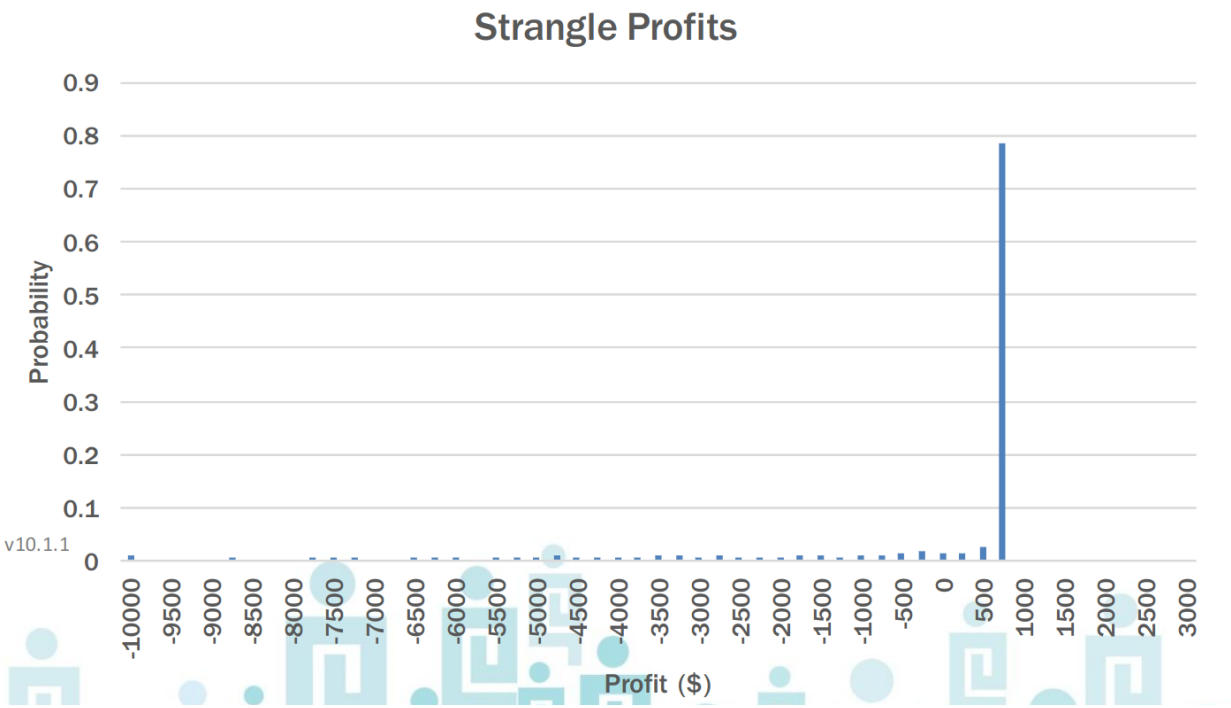
Example - A short straddle

This is the P/L distribution of a short one-year straddle. S=$100. Implied and realized volatility are both 30%.



Example - A short strangle

This is the P/L distribution of a short one-year 20-delta strangle. S=$100. Implied and realized volatility both 30%



Comparison: Straddle vs Strangle

Statistic	Straddle	Strangle
Average P/L	$0	$0
Median P/L	$384	$841
10%	-$2,274	-$1,994
Minimum	-$15,700	-$24,800
Percentage Winners	57%	78%