Everybody's Doing It: Short Volatility Strategies and Shadow Financial Insurers

Vineer Bhansali, CIO, LongTail Alpha

Larry Harris, Fred V. Keenan Chair in Finance, USC Marshall

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Agenda

- Introduction
- Who’s doing it? (The main strategies)
- Implications
- Some Evidence
- Conclusion

Introduction

Volatility-Contingent Strategies

This talk addresses two classes of volatility-contingent strategies:

- **Volatility-selling strategies**: Traders sell volatility (via options) hoping to make a return for bearing risk that investors do not want to hold.
  - Shadow financial insurers
- **Volatility-modulated strategies**: Investors scale their positions (lever up or down) based on their volatility expectations.

Both strategies are potentially destabilizing should volatilities experience a substantial prolonged rise.

Big Facts since the Financial Crisis

- The Fed, ECB and BOJ bought more than $10T in assets. Including the PBOC and others, this total is close to $14T in assets bought with a total CB stock of $20T (ECB 5.6, Fed 4.4, PBOC 5.7, BOJ 5.0).
- Interest rates were pushed extraordinarily low.
- Credit spreads were pushed to extremely tight levels.
- Volatility dropped (until recently) to record low levels.
- Asset prices rose everywhere.
- Implied volatilities have been high relative to realized volatilities (also until recently).

Some Other Facts

- Unfunded defined pension liabilities continued to grow due to low fixed income returns and unsustainable pension promises.
- American corporations are now repurchasing stock with cheaply repatriated funds, or with record corporate bond issuance at historically low yields and credit spreads.
- Selling volatility through derivatives and exchange traded products became much easier.

Implications

- Investors have been searching for yield. Searchers include pensions and endowments that need high investment performance to cover funding expectations.
- Low volatility and rising asset prices have caused many investors to discount risk, so that asset ownership becomes more attractive.
  - A positive feedback loop.
- Many funds now take have taken much more aggressive positions in volatility-contingent strategies.
- Retail investors have sold volatility extensively through inverse exchange traded volatility products.

Who’s Doing It?

Traders Participate across All Horizons

- Long horizon investors
  - Sovereign wealth funds — Sellers and modulators
  - Endowments and pension funds — Sellers and modulators
- Medium horizon investors
  - Yield-enhancing large asset managers — Sellers
  - Risk-parity hedge funds — Modulators
  - Risk premium harvesters — Sellers and modulators
  - Target volatility funds and variable annuity funds — Modulators
- Short horizon investors
  - Trend followers — Modulators
  - Volatility ETF and ETN investors — Sellers
  - Option market makers — Sellers

Volatility Sellers

Shadow Financial Insurers

Volatility Sellers

- Traders sell volatility when they
  - Sell puts and calls (“straddles” and “strangles”).
  - Sell products defined on volatility indices such as the VIX.
  - “Roll-down” the VIX futures curves (the “volatility carry trade”).
  - Engage in other risk premium harvesting strategies.
- These strategies have been profitable because implied volatilities have been high relative to realized volatilities.

Sellers and Buyers

- Although every trade has a buyer and a seller, the secular drop in volatility prices across all assets suggests that sellers have been more aggressive than buyers have.
- But perhaps realized volatility simply dropped due to fundamental reasons, such as low macroeconomic volatility.
- We think economic and political fundamentals suggest that volatility should be higher.
  - Others may disagree.

Fundamental Sources of Risk

- Increasing political uncertainty, especially since the 2016 election.
- Fed pulling back on liquidity.
- Continued problems with entitlement funding.
- Increasing income distribution inequalities throughout the developed world leading to increasing political engagement of the working classes in democracies.
- Changes in expected growth rates due to demographic issues.
  - Dropping fertility rates.
  - Longevity issues leading to an increase in the ratio of retirees to workers.

Are Things Different Now?

- The future has always been uncertain.
- Perhaps fundamental risk is not higher than before, but it almost certainly has not fallen.
- So why have realized and implied volatility fallen?

Volatility-Modulated Strategies

Volatility as a Key Input in the Decision Process

Volatility-Modulated Strategies

- Many investors' strategies target overall volatility risk.
- If the target risk is 15% per year, and they estimate the unlevered risk of an asset/asset class to be 10%, they borrow to lever up the position by 50%.
- The leverage increases expected returns when the expected asset return is greater than the margin loan rate.
- The temptation is greatest when rates are very low.

Common Volatility-Modulated Strategies

- Volatility Targeting
  - Essentially portfolio insurance used by target volatility funds and variable annuity funds.
- Risk parity
  - Funds hold multiple assets, each levered to a common risk target.
- Trend following
  - Momentum traders hold diversified asset classes, with volatility of each asset determining relative allocation.
- Risk premium harvesting
  - Funds harvest a diversified set of premiums where premiums are usually proportional to risk.

Additional Observations

- Not all investors who employ these strategies target volatility, but many do.
  - The fact that some investors who employ these strategies do not target volatility does not reduce concerns about those who do.
- Some investors target volatility at both at the asset level and the overall portfolio level.
  - Diversification lowers portfolio risk.

Implications

When the Market Moves Significantly or Volatility Spikes …

- Sold options become more valuable and gamma becomes more negative.
- Short volatility participants hedge by trading in the underlying markets.
- Volatility usually rises when the index falls, so the risk is greater in "sell-offs" than in "melt-ups."
  - Since 1989, the correlation of VIX changes to SPX returns is -0.69.
  - Both scenarios are potentially dangerous.
- The resulting feedback can be destabilizing.

A Simple Model of Instability: 1-Year Option Straddle (Put and Call)

- At an implied volatility of 30% (2008-9), the price of a 1-year straddle is 23% ("the carry").
  - *Gamma* is -2.5.
- At 20%, the price of the straddle is 15.7% and *gamma* is -3.9.
  - To obtain the same carry, investors must sell 46% more options, giving an equivalent scaled *gamma* of -5.71 = -3.9 × 1.46.
- At 10% (2017), the price of the straddle is 7.8%.
  - The equivalent scaled *gamma* is -23.4.

The same carry requires 9 times more negative gamma. This short volatility strategy is very exposed to market fluctuations.

More Consequences of a Market Fall

- Other short volatility sellers get hurt and cover their positions.
  - Their covering leads to an increase in implied volatility.
  - Withdraws from the market increase implied volatility and exacerbate the problem.
- Volatility-modulated traders start selling assets.
  - The sales depress asset prices and increase implied volatility.
- These responses can increase both realized and implied volatility.
  - The resulting feedback can be destabilizing.

The Fear

- Investors may not recognize that so many strategies will lead to correlated trading.
  - Investors blinded by their need for yield.
  - Investors made complacent by the prolonged economic expansion.
  - Investors who have forgotten that all correlations approach 1 in absolute value in extreme volatility episodes.
- Traders willing to provide liquidity may withdraw.
  - Market makers who provide immediacy.
  - Fundamental traders who provide depth and resiliency.
  - Many algorithms may switch off simultaneously.

The Big Open Question

- Why was realized volatility so low for so long when many would have expected it to be higher?
  - Perhaps realized volatility was due to low macro-economic volatility.
- Potential Stabilization Mechanisms
  - Investors buying on dips ultimately funded by central bank open market operations.
    - Investors emboldened by the prolonged economic expansion.
  - Corporate share repurchases on dips.
  - Intentional volatility suppression by central banks?
  - Effect of “delta hedging.”

Another Local Stabilization Mechanism

- Speculators who sell VIX hold short index positions to hedge (because VIX rises when the index falls).
- They may buy the index when VIX rises as the market drops because they believe locally VIX is mean reverting.
- This strategy only works locally.

Volatility Targeting and Portfolio Insurance Compared

- Portfolio insurers sell when the market drops. They buy when the market rises.
- Volatility targeters sell when they expect that volatility will be higher (or is higher). They buy when they expect it will fall (or has fallen).

- Historically, volatility drops when the market rises and vice versa so that the two strategies have similar effects.

Investor Confidence

- Increased confidence (and thus purchases) by investors emboldened by their portfolio insurance strategies undoubtedly contributed to the market runup before the Stock Market Crash of October 1987.
- Likewise, the low volatility of the last few years undoubtedly emboldened some volatility modulators and thereby contributed to the recent runup in prices.
  - Did the confidence associated with that runup contribute to the reduction in realized and implied volatilities?

Some Evidence

(Slides to be provided at the seminar presentation)

Conclusion

Summary

- Selling volatility has never been easier.
- The need for yield is acute and undoubtedly affects investor judgment.
- The prolonged bull market and the associated low volatility probably also affected risk perceptions.
- Many people now use volatility-modulated strategies, somewhat like portfolio insurance.
- Many investors probably are not aware of each other and the common factors driving their decisions and scaling.
- Market stability is more vulnerable than many realize.

Discussion