The Evolving Dynamics of VIX Futures: Stylized Facts

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Independent View

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Drivers of the low VIX regime

OVERVIEW

• Trend in underlying equities
• Low individual stock-specific volatility
• Low correlations among S&P 500 constituents
• Trade-off between variance risk premium and tail risk
Current Volatility Environment

• Implied volatility is low, realized volatility is even lower:

Source: Bloomberg, Independent View
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Current Correlation Environment

- Low correlations among S&P constituents reduce volatility of the index
- Implied correlation is low, realized correlation is even lower:

Source: Bloomberg, Independent View
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Current Trend Environment

- Trends in S&P and VIX have both been strong
- Strong equity fundamentals and high expectations drive S&P up and VIX down

Source: Bloomberg, Independent View
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Correlations: VIX and S&P500

- Prone to idiosyncratic trends
- Breaking down and mean-reverting

Source: Bloomberg, Independent View
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Market Ecology

• The options market shows alertness in historical context:

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Market Ecology

- SPX options entail pronounced skew and VIX option prices remain elevated:

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Risk Management

OVERVIEW

Trade-offs in Risk Management

- Desired payoff profile depends on the signal
- Convexity in relative positions
- Difficult to correctly time tail risk
- Easy to react too late to tail risk
Tail Risk

- Tail risk of a short VIX position is ever looming
- At low VIX levels, the skew is even magnified:

Source: Bloomberg, Independent View
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Convexity

- Positioning along the futures curve depends on the desired payoff profile

Source: Bloomberg, Independent View
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Regimes in S&P and VIX

- Two states of the world:
  - `Risk-on’: High expected returns and low volatility
  - `Risk-off’: Negative expected returns and high volatility

Source: Bloomberg, Independent View
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Trade Examples

OVERVIEW

• Presenting some stylized features of a volatility trading system
• Trade-off: long VXS positions to catch market disruptions vs roll yield
• Relative value opportunities
• Incorporate trends
• Distinguish between anticipated events vs unexpected outcomes
Trade Example: `Fire and fury’

- VIX index is statistically mean-reverting
- In July, VIX closed ten times below 10 → Unprecedented!
- Assume the following signals in a predictive system:
  - Expected VIX move: +
  - Expected roll-cost of VIX: (-)
  - Expected `risk-on’ S&P return: ++

⇒ Cheap relative position (long VXS + long SPX) to benefit from a breakout
- Caveat: historically unprecedented environment may give some false confidence in data
Trade Example: `Fire and fury’

- Profit from convexity; exponential pay-off in VIX
- Breakout profit taking indicator
- Comparison of z-scores in VIX vs S&P:

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Trade Example: Relative Value

- Estimate an equilibrium relationship between VIX and VSTOXX
- Risk of market-specific idiosyncrasies (e.g. US debt ceiling)
- In trading need to consider roll-down costs of both contracts

Source: Bloomberg, Independent View
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Trade Example: Relative Value

- Methodology: two-factor model of VIX and VSTOXX
- First factor explains the level of both curves, the second factor explains the difference

Source: Bloomberg, Independent View
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Trade Example: Relative Value

- Risk of sustained divergence
- Dynamic trading to sidestep roll-down distortions
- Intra-day statistical arbitrage opportunities

Source: Bloomberg, Independent View
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Trade Example: Relative Value

- Long VIX against Short VSTOXX in September 2017 futures:

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Summary and Conclusions

- An extraordinary year in terms of outcomes; more ordinary in causality
- There is no comfortable ‘no-brainer’ trade
- Trade-offs in risk management: now vs in crisis