PROJECT IDEAS

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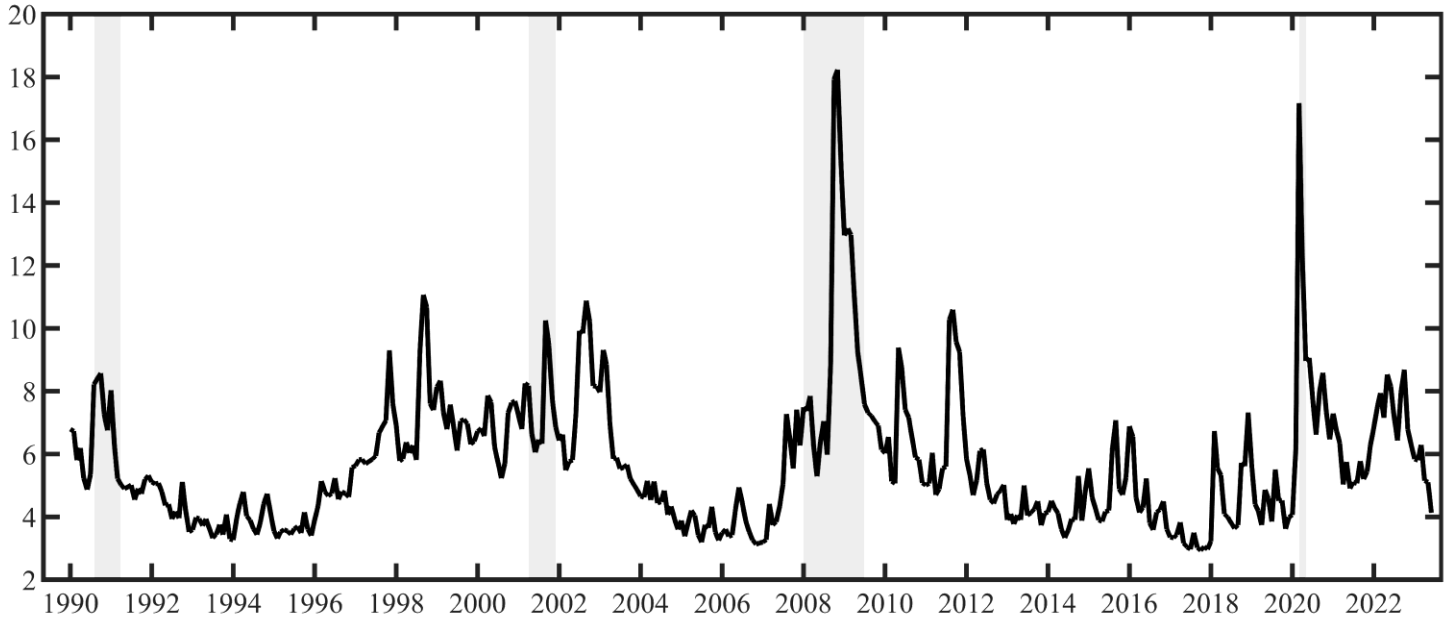
Topics

- VIX-based dynamic hedging
- Value vs. growth: a macro-based strategy
- Stock return kurtosis and crash exposure
- Timing beta exposure using idiosyncratic volatility
- Cross-sectional volatility spread as a timing signal
- Testing and extending the Betting Against Beta strategy
- Exploiting predictable intraday patterns with 0DTE options

VIX-BASED DYNAMIC HEDGING

Idea

- Dynamically hedge downside risk in an equity portfolio



Objective

- Volatility timing relies on scaling exposure
  - Barroso & Santa-Clara (2015), Daniel & Moskowitz (2016), Moreira & Muir (2017), Liu et al. (2019), Cederburg et al. (2020), Eisdorfer & Misirli (2020), Barroso & Detzel (2021), Wang & Yan (2021)
- Use the VIX as a forward-looking signal
  - Božović (2024)

Cboe VIX®

Strategy outline

- **Trigger signal** (VIX threshold or regime classification)
  - Define volatility regimes using VIX:
    - Low: VIX < 15
    - Medium: 15 ≤ VIX < 25
    - High: VIX ≥ 25
  - Alternatively, use a percentile-based threshold (e.g., hedge when VIX is in the top 20% of its trailing 1-year distribution)
- Use liquid, high-convexity **hedging instruments**

Strategy outline

- **Hedge construction rules**
  - When VIX enters a **high regime**:
    - Buy **out-of-the-money (OTM) SPX put options** (e.g., 5% OTM, 1-month expiry)
    - Size the notional of puts to hedge a portion of portfolio delta (e.g., hedge 20–50% of the equity notional depending on VIX level)
    - Alternatively, buy **VIX calls** or **long VIX futures** to benefit directly from a spike in volatility
  - When VIX is **low**:
    - Let the hedges expire, or monetize residual value if they're in the money
    - Refrain from initiating new hedges

Strategy outline

- **Dynamic adjustment**
  - Rebalance hedge positions **weekly or daily**, based on updated VIX levels
  - Use rolling windows (e.g., trailing 21-day average VIX) for smoothing

Data

- VIX
- Hedging instruments
  - SPX puts
  - VIX futures or VIX calls
- More feasible – ETF equivalents:
  - VIXY
  - SPLV
  - TLT
  - SH
  - SWAN, TAIL

ETF-based hedge execution

- When VIX triggers a high-risk regime, execute one of the following:

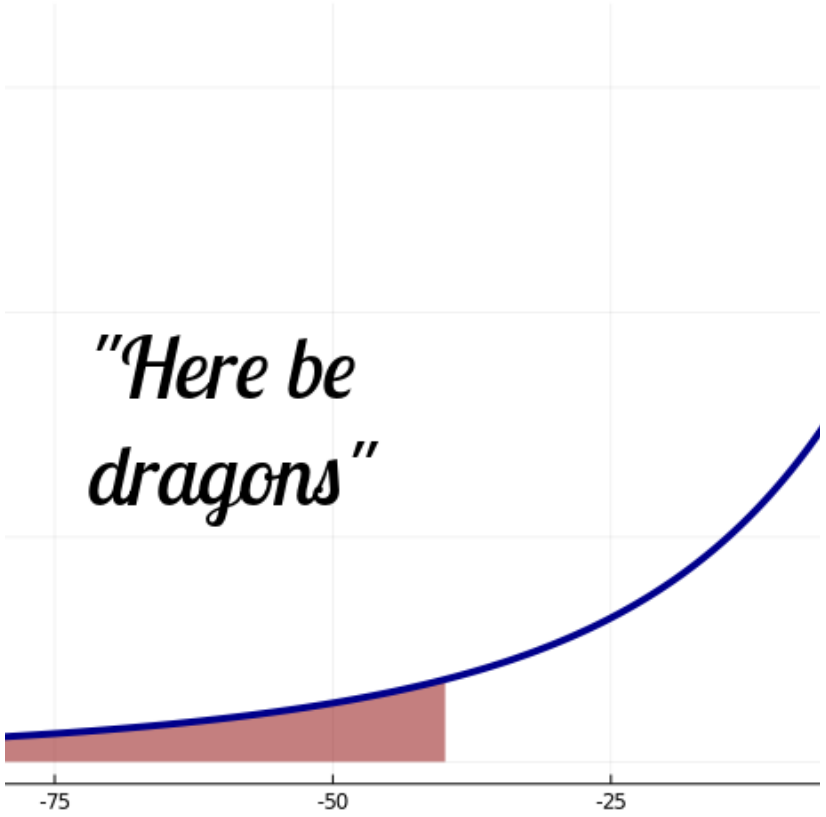
ETF Ticker	Description	Role in Hedge
VIXY	Short-term VIX futures ETF	Direct exposure to volatility spikes
SPLV	S&P 500 Low Volatility ETF	Reduce portfolio beta, smooth drawdowns
TLT	Long-term Treasuries (20+ yr)	Flight-to-quality hedge
SH	Short S&P 500 (inverse ETF, 1x)	Linear hedge vs. equity downside

Implementation example

- Assume a fund that manages a $100M active equity portfolio (pick any core strategy)
- In high-VIX regime:
  - **Reduce 5–10% equity exposure**
  - **Reallocate into a hedge basket** (e.g., 50% VIXY, 25% TLT, 25% SH)
  - Keep the core strategy unchanged: this is a **temporary allocation shift**, not a full regime switch
- Rebalance weekly or as VIX exits the high-risk zone

Performance expectations: derivatives

- VIX contains **forward-looking information** about **volatility and kurtosis**
  - Not just second moments but higher-order (tail) risk
- When VIX is high:
  - **Options are expensive**, but so is the **risk**
  - You're paying for insurance when you need it
- This strategy targets the **source of tail risk** instead of exposure reduction



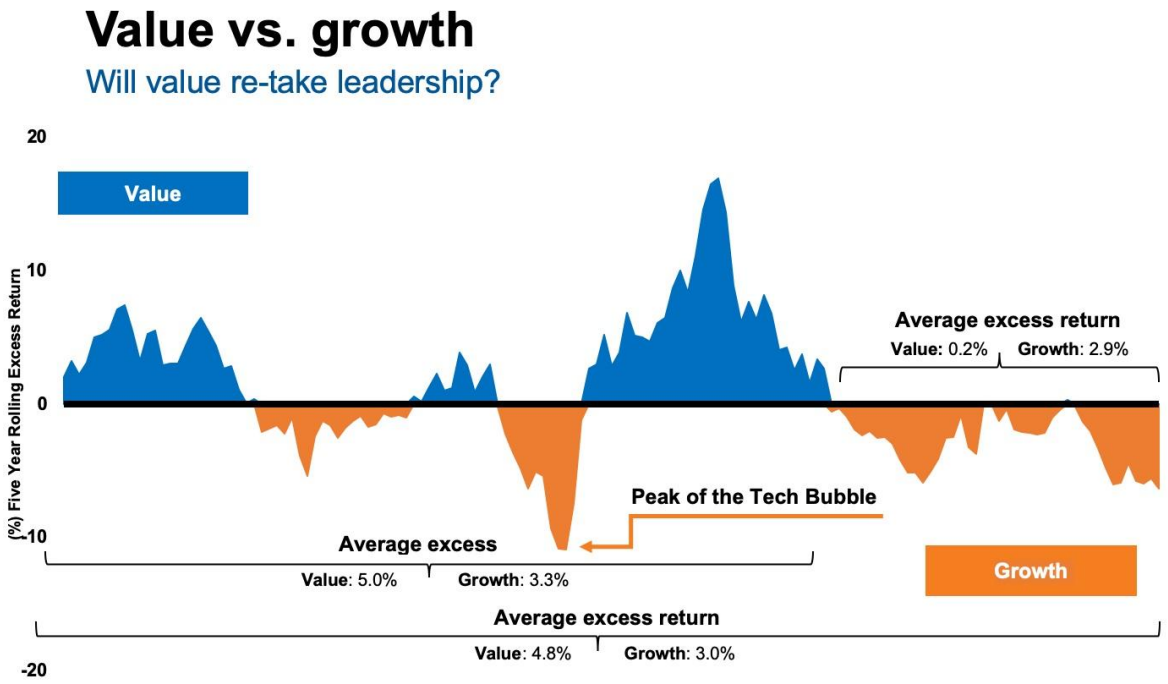
Performance expectations: ETFs

- When markets are **stable:**
  - Hedge underperforms
  - But cost is limited
- During **tail events**:
  - Hedge ETFs (esp. VIXY and TLT) gain sharply
- **Net result:**
  - Smoothed equity P&L
  - Improved Sharpe ratio
  - Lower drawdown

VALUE VS. GROWTH: A MACRO-BASED STRATEGY

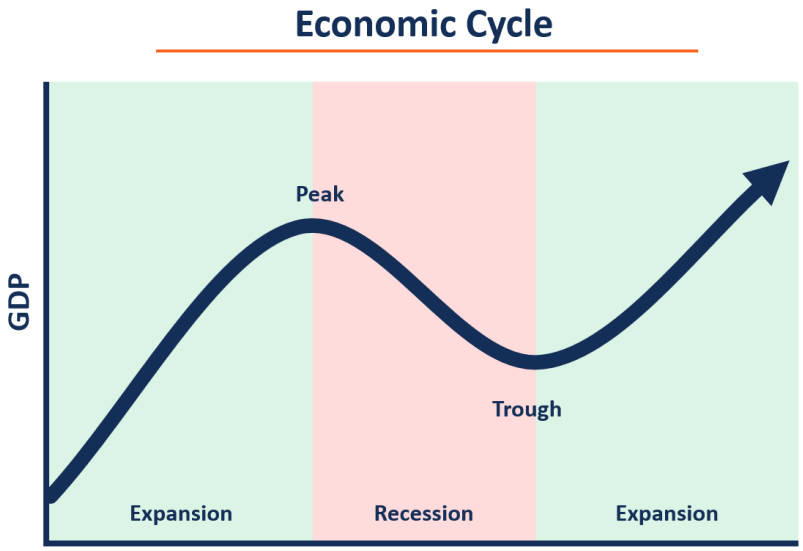
Idea

- Test whether simple macro indicators can improve the performance of value-vs-growth portfolios



Objective

- Dynamically allocate between value and growth equities based on prevailing macroeconomic conditions
- Exploit predictable shifts in factor performance **across business cycles**
- Generate improved risk-adjusted returns by aligning exposures with the macro environment



Strategy outline

- **Signal construction:**
  - Define macro regimes (e.g., expansion, slowdown, stagflation, recovery) using thresholds
  - Estimate expected relative performance of value vs. growth in each regime
- **Portfolio implementation:**
  - Allocate between value and growth based on current macro regime
  - Adjust weights monthly or quarterly with a lag to avoid data snooping

Data

- Monthly macroeconomic indicators (e.g., inflation, unemployment, real GDP growth)
- Fama-French style portfolios

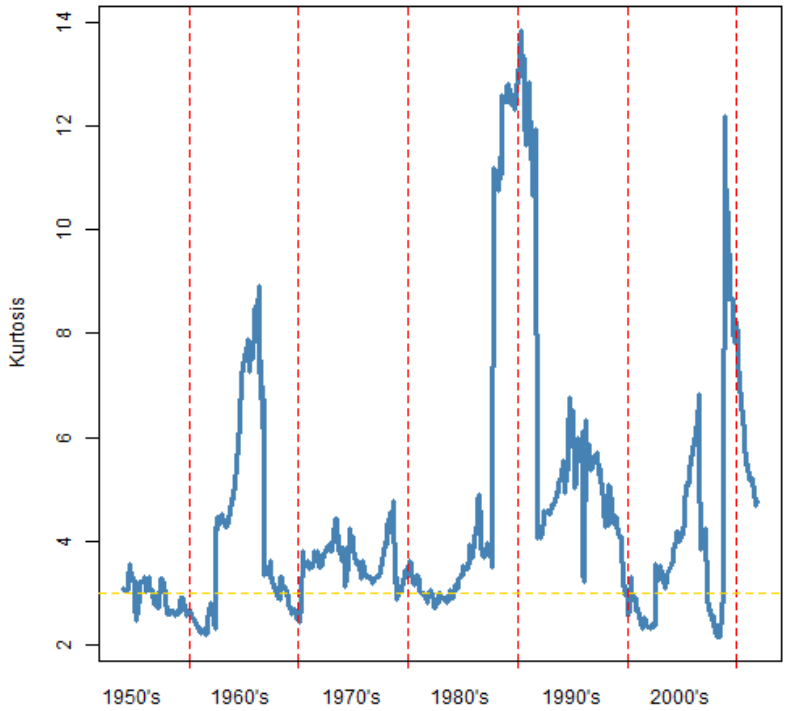
Performance expectations

- **Why it works?**
  - Value and growth styles respond differently to inflation, interest rates and earnings outlooks
  - Timing exposure reduces prolonged underperformance from static allocation
  - Macro regimes exhibit persistence, providing exploitable predictability
- **Expected outcomes:**
  - Higher Sharpe ratio than unconditional value or growth exposure
  - Reduced drawdowns during adverse cycles
  - Improved performance over full market cycles

STOCK RETURN KURTOSIS AND CRASH EXPOSURE

Idea

- Investigate whether elevated realized kurtosis in index or stock returns signals impending market crashes or volatility spikes



Objective

- Identify and measure individual stock **exposure to tail risk** via return kurtosis
- Construct portfolios that balance return and crash exposure by **filtering high-kurtosis stocks**
- Explore the **pricing of higher-moment risk** in cross-sectional stock returns

Strategy outline

- **Signal construction:**
  - Estimate ex-ante return kurtosis for each stock
  - Identify stocks with persistently high crash risk profiles
  - Form long-short portfolios that overweight low-kurtosis stocks and underweight high-kurtosis stocks
- **Portfolio implementation:**
  - Simple equal weighting
  - Monthly rebalancing to update crash exposure estimates

Data

- Daily or weekly stock returns (e.g., CRSP data, S&P 500 universe)
- Computed rolling kurtosis over fixed windows (e.g., 6 or 12 months)

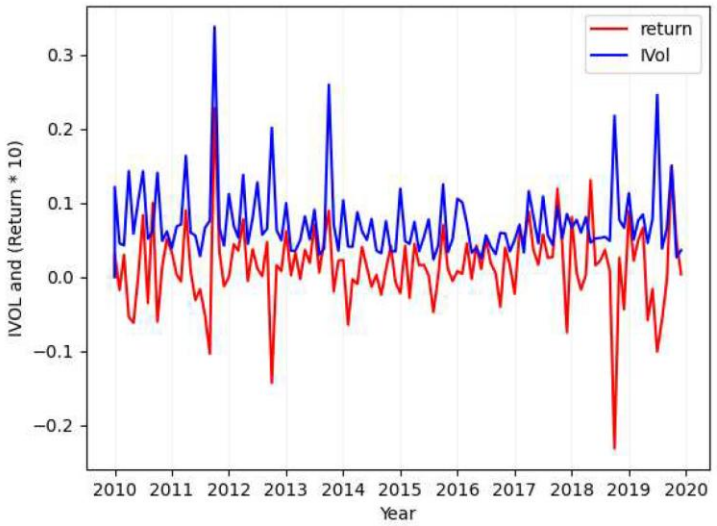
Performance expectations

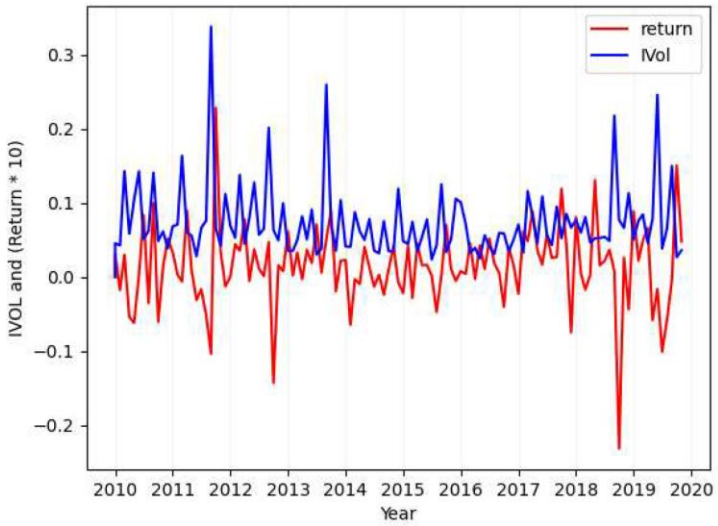
- **Why it works?**
  - Kurtosis captures crash risk that volatility overlooks
  - Market participants underprice extreme left-tail risk, creating a premium for low-kurtosis stocks
  - Avoiding crash-prone assets enhances compound returns during market stress
- **Expected outcomes:**
  - Improved downside protection and lower tail risk exposure
  - Consistent performance during crisis periods and high-volatility regimes
  - Potential alpha from neglected pricing of higher-moment risks

TIMING BETA EXPOSURE USING IDIOSYNCRATIC VOLATILITY

Idea

- Test whether periods of high average idiosyncratic volatility predict lower equity market returns
- Use that to modulate beta exposure





Objective

- Investigate whether idiosyncratic volatility (IVOL) contains information about future stock returns
- Dynamically **time market beta exposure** based on aggregate IVOL levels
- Design a risk-managed portfolio that adapts to changes in **firm-specific uncertainty**
- Explore IVOL as a proxy for sentiment or market fragility

Strategy outline

- **Signal construction:**
  - Cross-sectionally rank stocks by IVOL
  - Define IVOL quintiles or deciles
  - Compute average market beta for each group
- **Timing rule:**
  - When aggregate IVOL is high (market-wide average IVOL above threshold):
    - Reduce beta exposure (shift to low-beta, low-IVOL stocks)
  - When aggregate IVOL is low:
    - Increase beta exposure (allow for higher-beta positions)
  - This can be applied to dynamically allocate weights in a beta-neutral or risk-managed portfolio.

Data

- Daily returns of individual stocks or portfolios
- Market model regressions to extract IVOL (residual variance from CAPM)
- Aggregate IVOL signal constructed by averaging across stocks or sectors

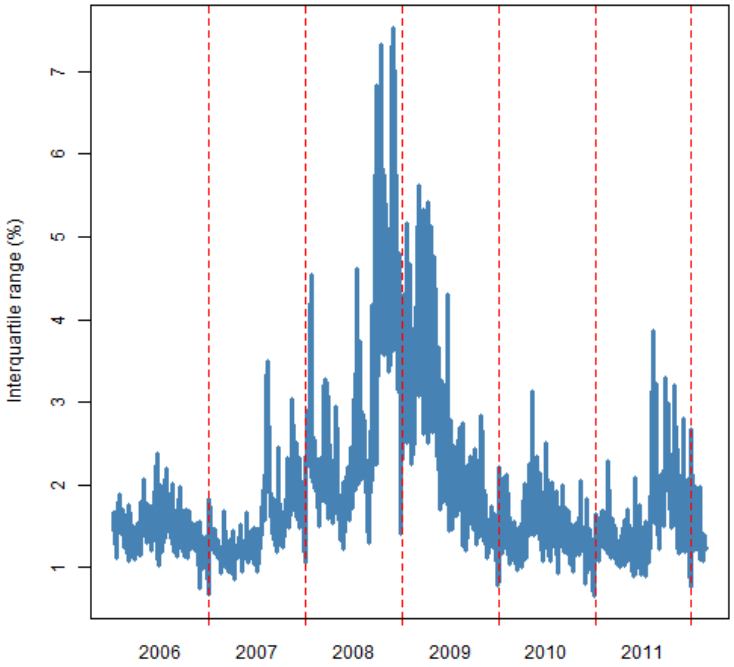
Performance expectations

- **Why it works?**
  - IVOL reflects stock-specific noise or disagreement among investors
  - High IVOL periods are associated with lower aggregate returns, especially for high-beta stocks
  - Using IVOL helps time factor exposures more precisely, especially when traditional beta strategies underperform
- **Expected outcomes:**
  - Improved risk-adjusted returns vs. static beta exposure
  - Reduced drawdowns in volatile environments
  - Outperformance during market reversals or sentiment shifts

CROSS-SECTIONAL VOLATILITY SPREAD AS A TIMING SIGNAL

Idea

- Use the spread between the most and least volatile stocks as a signal for aggregate market volatility or trend reversals



Objective

- Explore the predictive power of the **cross-sectional volatility spread** (CSVS) for market returns
- Use dispersion in stock-level volatilities as a forward-looking risk signal
- Develop a dynamic asset allocation strategy that reduces exposure during volatility clustering
- Investigate CSVS as an **early warning indicator** for systemic stress or market turning points

Strategy outline

- **Signal construction:**
  - Compute rolling realized volatility (e.g., 20-day or 60-day standard deviation of daily returns) for each stock
  - Sort stocks by realized volatility and calculate:

$$\text{CSVS}_t = \text{Average Vol}_{\text{top decile}} - \text{Average Vol}_{\text{bottom decile}}$$

  - Normalize the CSVS signal:

$$z_t = \frac{\text{CSVS}_t - \mu}{\sigma}$$

Strategy outline

- **Portfolio implementation:**
  - High dispersion ($z > 1$)
    - Signals elevated risk aversion or fragmentation
    - Defensive regime (reduce the risk exposure / beta)
  - Neutral zone ($-1 < z < 1$)
    - Signals intermediate risk aversion or steady market
    - Neutral regime (maintain the baseline risk exposure / beta)
  - Low dispersion ($z < -1$)
    - Signals low risk aversion or market calm
    - Aggressive regime (increase the risk exposure / beta)

Data

- Daily returns of a large stock universe
- Rolling estimates of individual stock volatilities

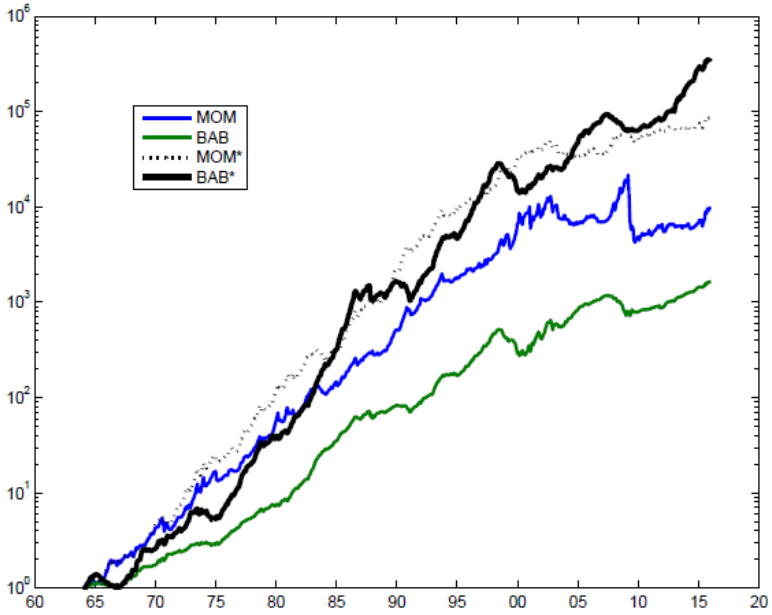
Performance expectations

- **Why it works?**
  - Rising dispersion often precedes market corrections
  - Traditional risk metrics may lag
  - CSVS provides early signal of regime shifts
  - Helps mitigate downside risk while exploiting calmer trends
- **Expected outcomes:**
  - Downside protection, superior to static allocation
  - Enhanced Sharpe ratio through volatility timing
  - Robust outperformance in high-volatility regimes

TESTING AND EXTENDING THE BETTING AGAINST BETA STRATEGY

Idea

- Replicate the classic BAB strategy using stock-level data
- Investigate whether its performance varies across volatility, interest rate or macroeconomic regimes



Objective

- Reproduce the classic BAB strategy of Frazzini and Pedersen (2014) using updated data
- Test the robustness of BAB returns across market regimes and subperiods
- Explore enhancements by conditioning beta exposure on market volatility or macro indicators
- Investigate whether dynamic beta timing improves the risk-adjusted performance of the BAB portfolio

Strategy outline

- **Signal construction:**
  - Rank stocks based on beta estimates
  - Go long low-beta stocks and short high-beta stocks, dollar-neutral
  - Optional enhancements:
    - Add volatility timing à la Barroso et al. (2025)
    - Add macro filters
- **Portfolio implementation:**
  - Monthly rebalancing
  - Test performance across subperiods, sectors and market conditions

Company	Symbol	Zacks Rank	Zacks Rank 1-wk Ago	EPS Estimate (Current Yr)	EPS Suprise (Last Qtr)	Report
SMITH & WE...	SWHC	1	2	$1.35	33.33%	
ARCTIC CAT...	ACAT	2	3	$3.28	-12.82%	
CALLAWAY G...	ELY	2	3	$0.22	35.71%	
POLARIS IN...	PII	2	3	$6.67	1.86%	
POOL CORP	POOL	2	4	$2.39	-6.85%	
BLACK DIAM...	BDE	3	4	$0.10	-15.38%	
BRUNSWICK...	BC	3	4	$2.61	11.32%	
MARINE PRO...	MPX	3	4	$0.23	-16.67%	
STURM RUGE...	RGR	3	1	$4.19	19.01%	
WEST MARIN...	WMAR	3	3	$0.63	-8.57%	NA

Extensions considered

1. **Factor conditioning**

- Combine BAB with cross-sectional signals like:
  - Value (e.g., low-beta + cheap stocks)
  - Quality (e.g., low-beta + high profitability)
  - Volatility (e.g., low-beta + low-vol)

2. **Dynamic exposure scaling**

- Scale the BAB exposure based on macro indicators:
  - Credit spreads
  - VIX
  - Market trend/momentum
  - Interest rate levels

3. **Sector-neutral BAB**

- Prevent unintended sector tilts (e.g., low-beta tends to overweight utilities)
- Apply BAB ranking within sectors, then aggregate across sectors for neutrality

Data

- Daily or monthly returns of individual stocks
- Estimated stock betas via rolling regressions against the market portfolio (Kenneth French's Data Library)

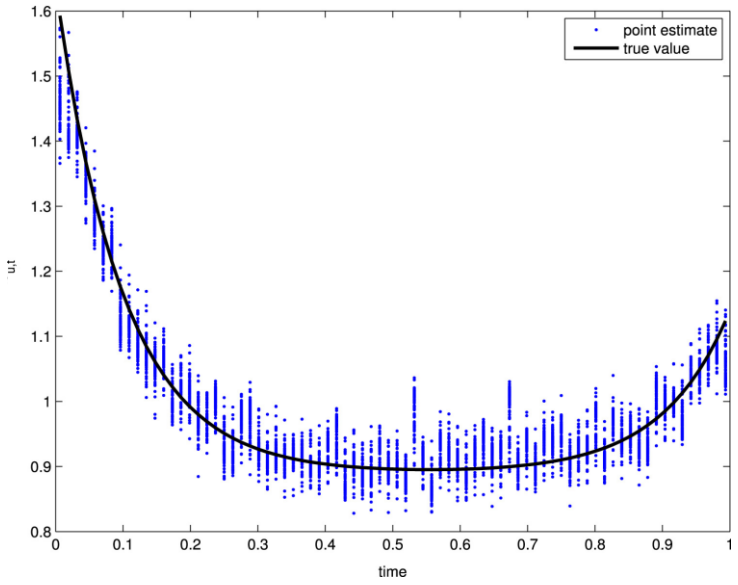
Performance expectations

- **Why it works?**
  - Investors often favor high-beta stocks expecting higher returns, leading to their overpricing
  - Low-beta stocks can be underpriced, offering superior risk-adjusted returns
  - BAB captures this anomaly while maintaining market neutrality
- **Expected outcomes:**
  - Consistent alpha with low correlation to traditional risk factors
  - Lower drawdowns in bear markets due to defensive low-beta tilt
  - Enhanced Sharpe ratios when combined with volatility-based scaling

EXPLOITING PREDICTABLE INTRADAY PATTERNS WITH 0DTE OPTIONS

Idea

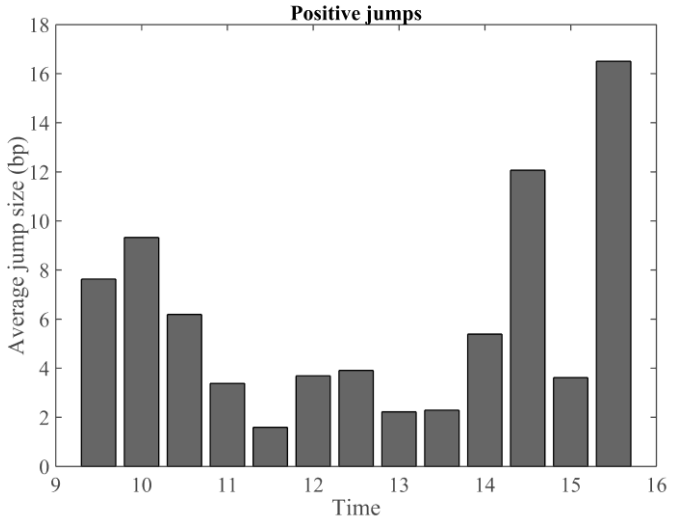
- SPX returns show predictable intraday volatility structures (diurnal patterns)
- These patterns also align with higher probabilities of jumps

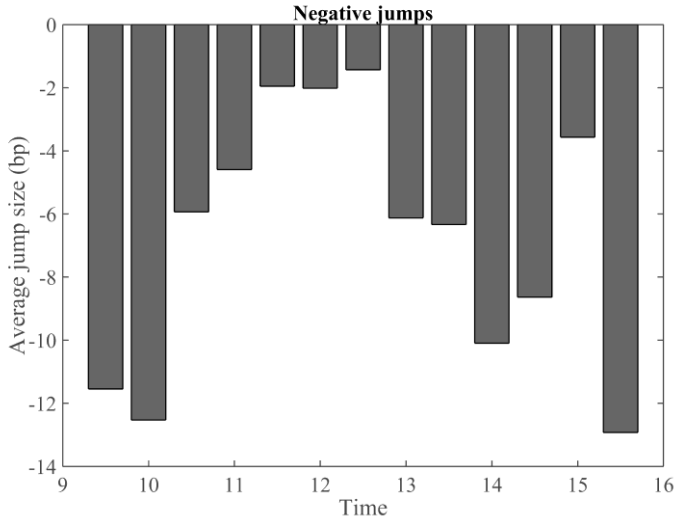


Objective

- Use predictable **intraday jump and volatility patterns** to exploit at-the-money SPX 0DTE straddles
- Test whether straddle returns are positive conditional on realized volatility exceeding expected value, based on historical intraday regimes
- Develop a systematic trading model

Jump patterns





Strategy outline

- **Signal construction:**
  - Estimate in-sample U-shaped diurnal component of SPX
  - Use de-seasoned return residuals to obtain in-sample jump patterns
  - Estimate out-of-sample realized volatility and conditional jump probability
- **Portfolio implementation:**
  - Buy 1 ATM straddle when realized volatility or jump risk is elevated
  - Exit based on:
    - Profit/loss threshold
    - Time stop near market close

Data

- Intraday SPX data
- Prices of 0DTE calls and puts

Performance expectations

- **Why it works?**
  - Intraday volatility and jumps are statistically predictable
  - ATM straddles profit from timing mispricings, not just magnitude
  - Strategy selectively enters high-move probability windows
- **Expected outcomes:**
  - High return with controlled downside
  - Increased Sharpe ratio during volatile, macro-sensitive regimes
  - Reduced drawdown