

IVOL Puzzle & Arbitrage Asymmetry

Objective: Replicate and extend Stambaugh, Yu & Yuan (2015) using data through 2024.

Key Idea: High IVOL deters arbitrage, causing mispricing to persist.

Our Contribution:

- Updated sample: 2014–2024 vs. their 1963–2011
- Expand anomaly list to 10 (excludes distress score)
- Adjust for Fama-French 5 factors, explore time variation

Framework from Stambaugh (2013):

- Arbitrage asymmetry: shorting is riskier → mispricing persists more for overpriced stocks
- Mispricing-Return link stronger in low-IVOL stocks

Methodology Overview

IVOL: Std. dev. of residuals from daily FF3 regressions over a 1-month window

Mispricing Score:

- Based on 10 anomalies (momentum, accruals, investment, etc.)
- Rank-based composite score across cross-section each month

Portfolio Construction:

- Double-sort: 5x5 on IVOL and mispricing
- Long Q5 (most underpriced), short Q1 (most overpriced) within IVOL quintiles
- Evaluate alphas and Sharpe ratios

Key Results (Ours vs. Stambaugh)

Metric	Low IVOL	High IVOL	Comment
Our Mispricing Return (Q5–Q1)	1.12%	0.15%	Matches SY&Y finding of monotonic decline
Alpha (FF3)	Sig.	NS	Consistent with IVOL puzzle
Sharpe	0.68	0.08	Matches pattern in original study
Time-Variation	Stronger IVOL effect post-2019	Especially during COVID	New insight

Our Novel Findings:

- FF5-adjusted alphas persist in low-IVOL portfolios
- Microcap exclusion does not erase effects
- Sentiment data (e.g., Baker-Wurgler) supports asymmetric arbitrage risk theory

Robustness & Extensions

- Tested alternate IVOL windows (1M, 3M, 6M): results consistent
- Returns persist even when filtering for liquidity, excluding smallest 20% by mkt cap
- Anomaly weights equal vs. optimized: same qualitative conclusions

Comparative Detail from SY&Y (2013):

- Found sharper negative IVOL-return link among overpriced stocks (short legs)
- Our update confirms asymmetry, but effect sizes slightly attenuated in recent years
- Larger role for sentiment in COVID/post-COVID period

Conclusion & Takeaways

Synthesis:

- Confirms arbitrage asymmetry & IVOL puzzle from original study
- Mispricing returns conditional on IVOL level

What We Add:

- Updated evidence through 2024
- Focus on post-2010 dynamics, where ETFs and quant strategies changed arbitrage frictions
- Reinforcement of IVOL as a critical limit to arbitrage across anomaly types

Future Directions:

- Investigate role of institutional ownership & short interest
- Nonlinear machine learning approaches to mispricing construction
- International evidence on IVOL/mispricing relation