



Quantitative Analysis Challenge

Team 15

iiitm12-alpha1

Hypothesis

Stocks displaying recent volume momentum, lower closing prices, and revealing higher tail risk in market capitalization and returns may present an opportunity for exceptional market returns.

Simulation Settings:

Decay: 13

Neutralisation: Slow + Fast factors

Universe: Top 3000

Truncation: 0.08

■ Detailed Strategy Explanation

Volume Momentum and Decay :

- rank(ts_decay_linear(volume/ts_sum(volume, 252),20))
- Captures recent changes in trading volume, emphasizing the ratio of current volume to the sum of the previous year's volume.
 - A 20-day linear decay ensures recent trading activity holds greater weight in the ranking, providing insights into market momentum.

Tail Correlation of Market Capitalization and Returns:

rank(ts_co_kurtosis(cap,returns,252))

- Examines the co-occurrence of market capitalization and returns, measured by co-kurtosis over the last 252 days.
- High co-kurtosis indicates a linked tail risk, suggesting that extreme returns coincide with significant market capitalization changes, potentially reflecting impactful news or events.

Recent Price Reversal :

rank(-ts_delta(close,20))

- Identifies stocks that have experienced recent declines by calculating the difference between the current closing price and the closing price 20 days ago.
- The ranking emphasizes recent losses, offering insights into stocks that have fallen in the past month

■ Detailed Strategy Explanation

Strategic Insight:

- This alpha strategy integrates insights from volume momentum, tail risk correlation, and recent price declines.
- By combining these elements, the strategy aims to provide a comprehensive tool for identifying stocks with potential momentum, tail risk sensitivity, and recent price movement, offering a nuanced perspective for strategic decision-making in dynamic financial markets.

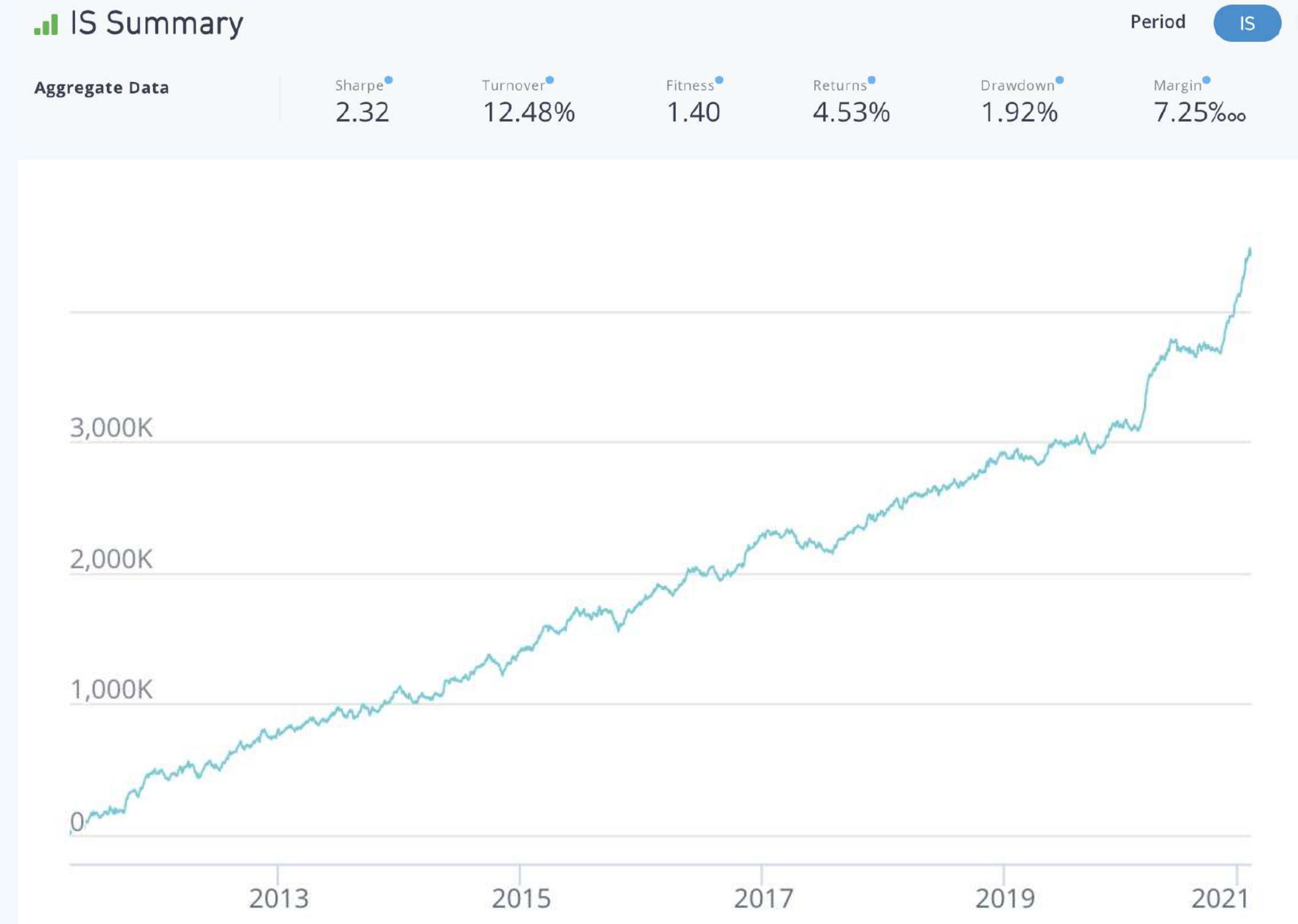
Machine Framework utilization:

- The combined alpha idea is finally neutralized against a customized grouping field from pv13 dataset obtained by comparing them using BRAIN API

Steps to avoid overfitting:

- Implemented a careful feature selection process to include only relevant features aligned with the alpha hypothesis.
- Avoided overfitting by tuning parameters judiciously.

■ Performance Metrics

**References:**

Tail risk - [Tail Risk in Momentum Strategy Returns](#) by Kent D. Daniel, Ravi Jagannathan, Soohun Kim :: SSRN

Trading volume - [Price Momentum and Trading Volume](#) by Charles M.C. Lee, Bhaskaran Swaminathan :: SSRN

iiitm12-alpha2

Hypothesis

Inspired by the 'size effect' favouring smaller firms with higher risk-adjusted returns, the strategy capitalizes on increased volatility and potential downtrends to improve trading outcomes. Utilizing a moving average crossover signal, it identifies short-term trading opportunities in stocks with higher daily returns relative to market capitalization.

Simulation Settings:

Decay: 10

Neutralisation: Slow Factors

Universe: ILLIQUID_MINVOL1M

Truncation: 0.008

■ The “Size - Effect”

Theory :

The 'Size Effect' is a phenomenon observed in the stock market where the size or market capitalization of a company influences its risk-adjusted returns. Notably, smaller firms often exhibit superior risk-adjusted returns compared to larger counterparts. This contradicts traditional market theories and suggests that factors beyond market capitalization play a significant role in determining a stock's performance.

Outperformance of Smaller Firms:

Research consistently shows that smaller firms tend to deliver higher risk-adjusted returns over time.

Implications for Trading Strategy:

Our strategy leverages the Size Effect by strategically selecting stocks based on the -returns/cap ratio, focusing on smaller firms that demonstrate superior risk-adjusted returns.*

Challenging Conventional Wisdom:

The Size Effect challenges conventional market models, indicating that factors beyond size influence stock performance.

■ Detailed Strategy Explanation

Signal Calculation:

- The trading signal is determined by comparing the 20-day and 90-day moving averages closing prices.
- A negative signal occurs when the 20-day average falls below the 90-day average, indicating a potential short-term downtrend.
- The signal can be used to take short position based on our alpha idea.

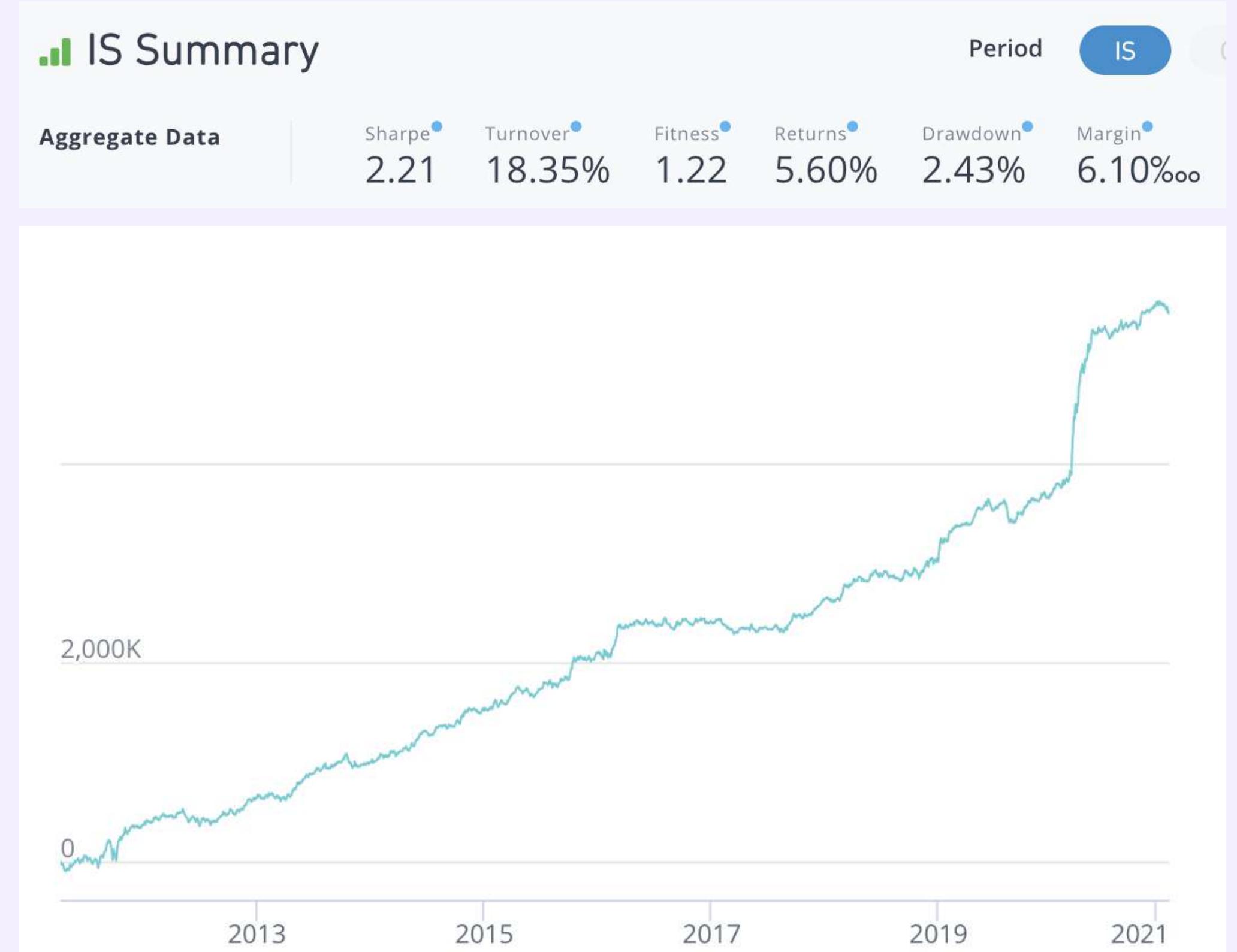
Trade Condition:

- The alpha idea involves ranking the ratio of returns to market capitalization over a 120-day period, then inverting this rank.
- The primary focus is on shorting stocks that show strong recent performance relative to their market capitalization, leveraging the negative momentum implied by the signal.

Holding Strategy:

- If the signal is not negative, the algorithm adopts a neutral position because the exit condition is false indicated by -1 in the trade_when function.
- This neutral stance is maintained until a negative signal re-emerges, at which point the trade condition is reactivated.

■ Performance Metrics



References:

Option Returns and Volatility Mispricing by Amit Goyal, Alessio Saretto :: SSRN

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■ Performance Metrics by Visualization Tools

Sharpe Ratio by Capitalization:

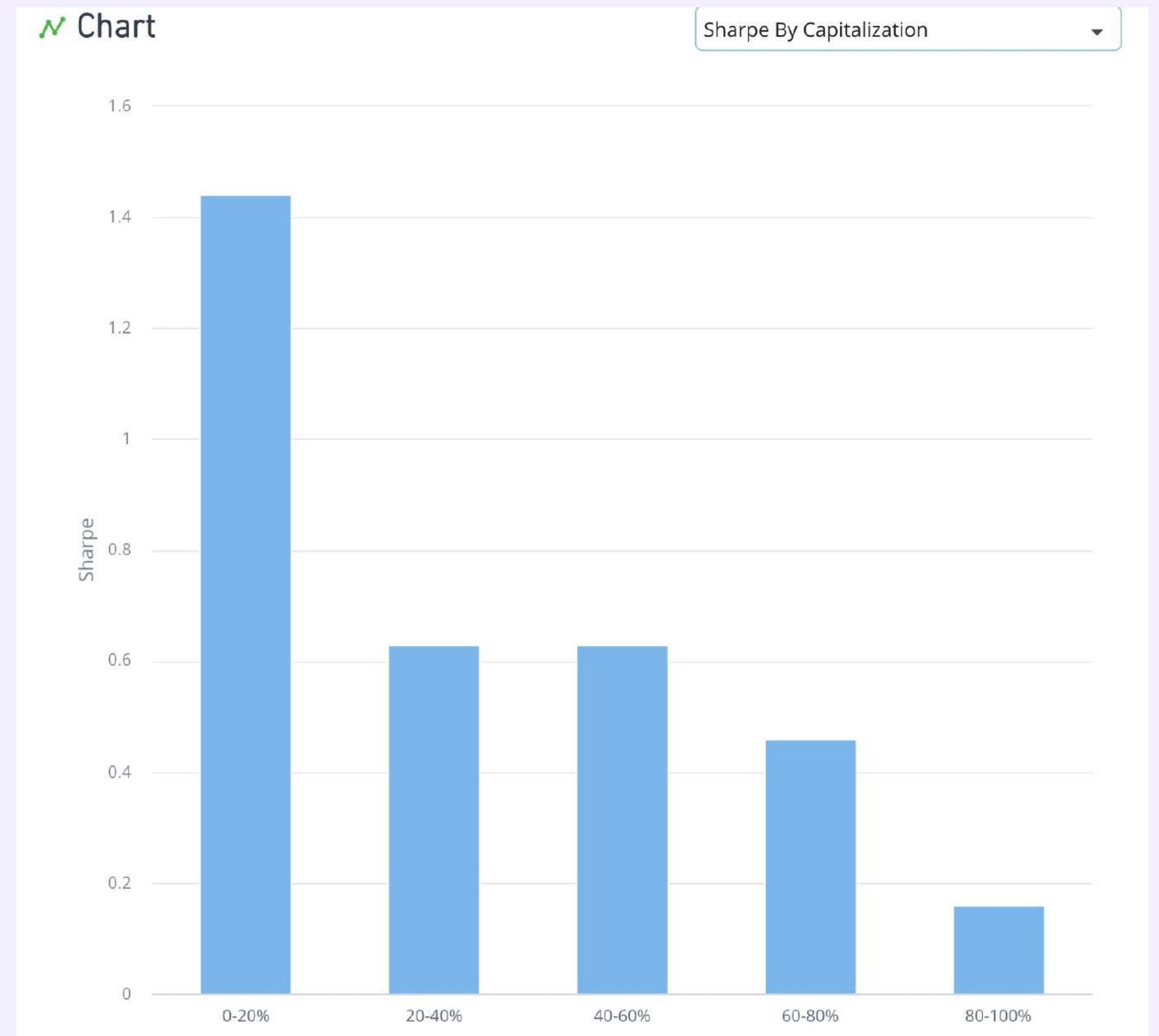
- Clear trend in Sharpe ratio performance.
- Highest Sharpe ratio observed in the 0-20% capitalization range.

Alpha Validation:

- Signifies positive outcomes for our alpha.
- Affirms the strategy's efficacy, especially in smaller firms.

Hypothesis Consistency:

- Aligns with the 'size effect' hypothesis.
- Demonstrates the strategy's proficiency in generating superior risk-adjusted returns in smaller capitalization segments.



■ Performance Metrics by Visualization Tools

P&L by Capitalization:

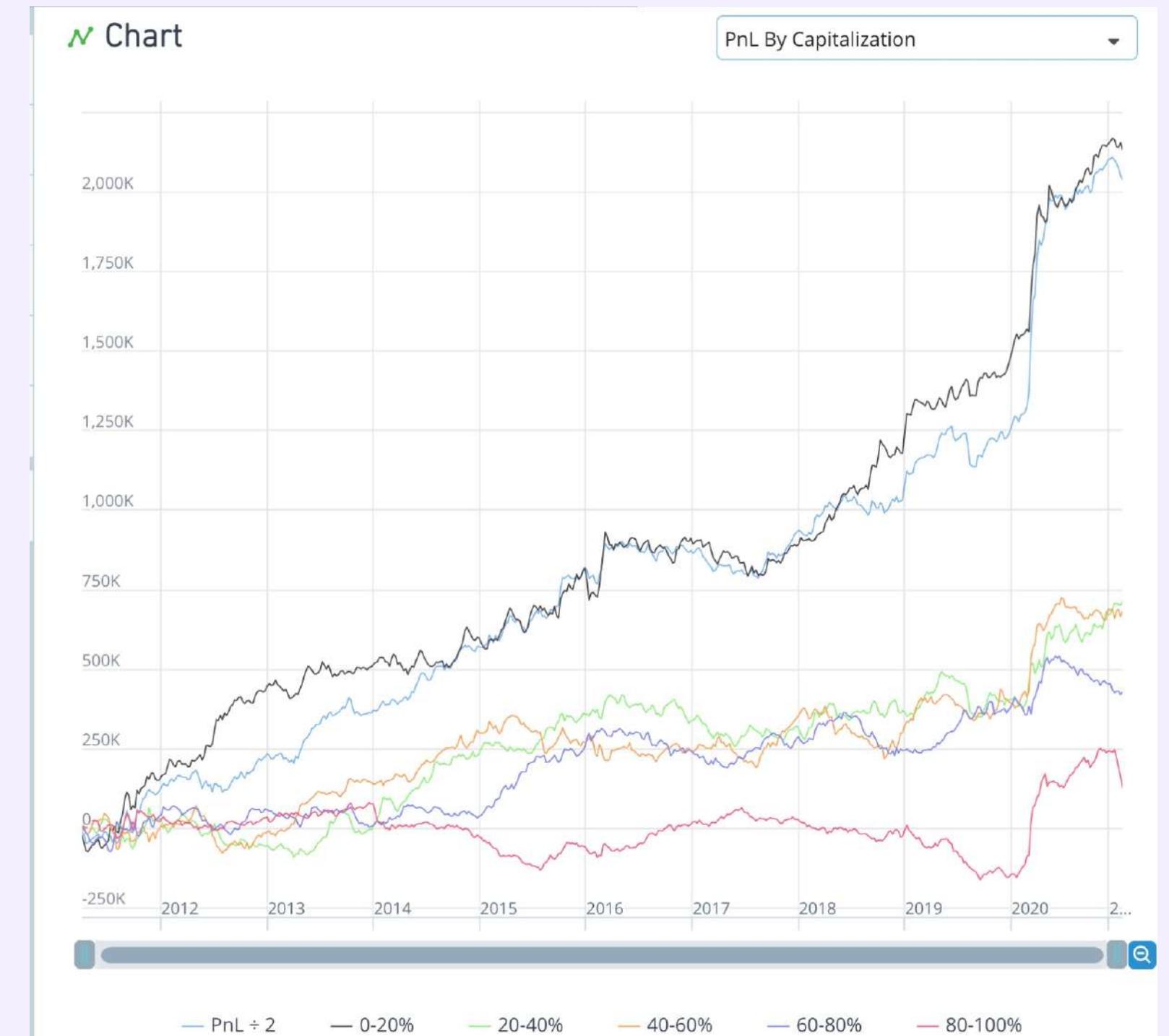
- Notable performance trend observed.
- Highest P&L in the 0-20% capitalization range.

Positive Signal for Alpha:

- Highest P&L reinforces the effectiveness of our alpha.
- Validates strategy's ability to excel, especially in smaller firms.

Hypothesis Alignment:

- Outcome supports the 'size effect' hypothesis.
- Demonstrates strategy's strength in generating superior risk-adjusted returns in smaller capitalization segments.



■ Steps taken to avoid Overfitting

Sound Ideation:

- We made sure that ratio involved in our alpha idea has proper significance in financial markets rather than just looking at good results.

Robust Parameter Optimization:

- Avoided over-optimizing strategy parameters based on historical data.

Rank Test:

- In the end, a rank() test was conducted on our final alpha expression to check for overfitting risks.

References:

Returns/Cap: <https://www.sciencedirect.com/science/article/abs/pii/0304405X81900180>

Shorting with size-effect: https://www.researchgate.net/publication/24070339_Short_Positions_Size_Effect_and_the_Liquidity_Hypothesis_Implications_for_Stock_Performance

iiittm12-alpha3

Hypothesis

High implied volatility, coupled with a significant deviation from its mean, indicates potential long-term trends in certain stocks. The strategy involves assessing dispersion across various strike prices to capitalize on mispricings arising from traders' differing views amid market uncertainty.

Simulation Settings:

Decay: 10

Neutralisation: Slow Factors

Universe: Top 3000

Truncation: 0.08

■ Detailed Strategy Explanation

Signal:

- The strategy initiates trades with stocks above the 65th percentile based on high implied volatility.
- Leads to combining volatility z-scores and dispersion ranks for trade decisions under market uncertainty.

Implied Volatility (IV):

- Implied volatility represents market predictions about future stock price fluctuations.
- High implied volatility signals expected significant price changes, while low implied volatility suggests stable prices.

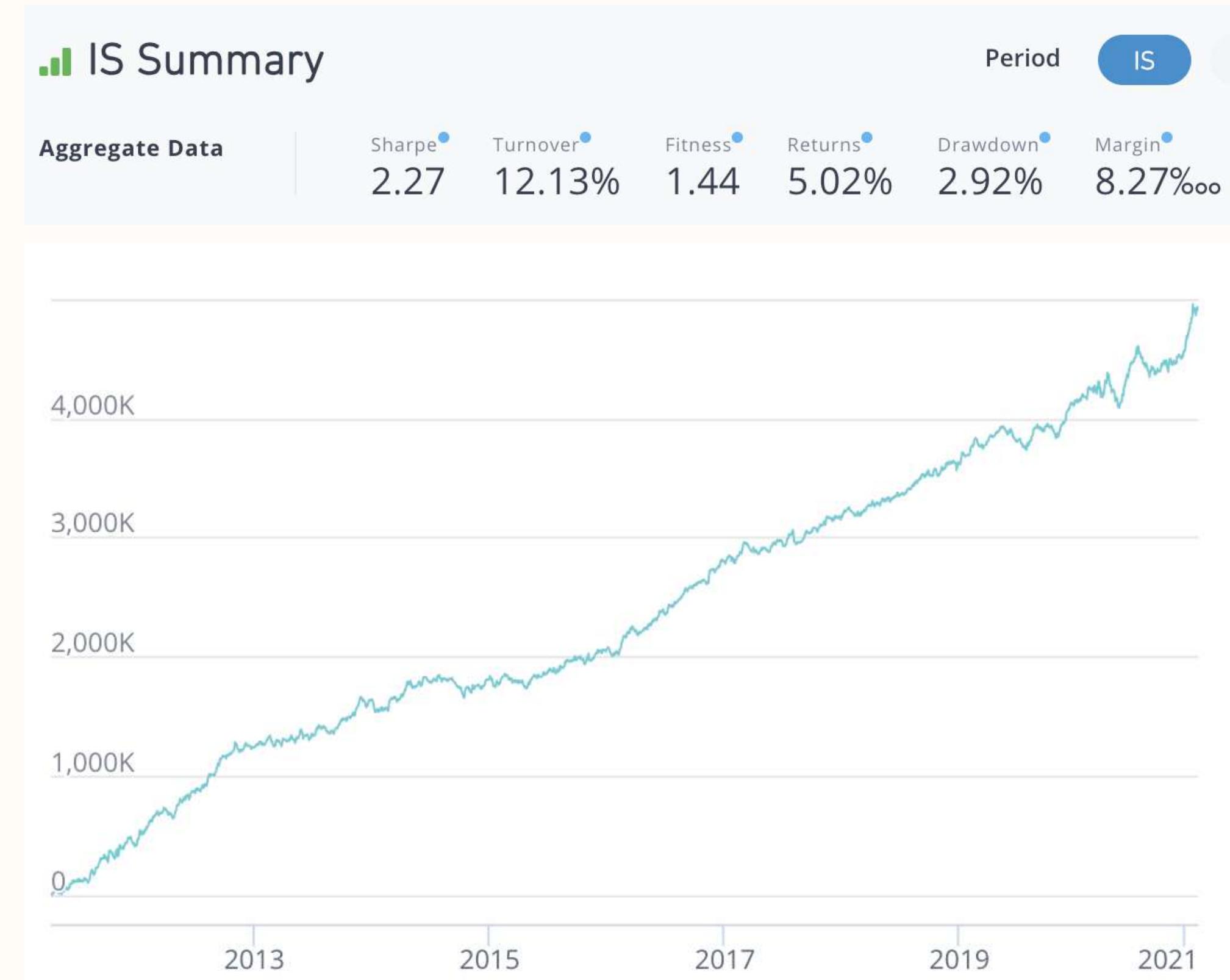
Dispersion in Call Options:

- Measures the accuracy and variability in implied volatility estimates.
- Higher dispersion signifies greater market uncertainty and opinion divergence.

Positioning:

- Measures the accuracy and variability in implied volatility estimates.
- Higher dispersion signifies greater market uncertainty and opinion divergence.

■ Performance Metrics



References:

[Option Returns and Volatility Mispricing by Amit Goyal, Alessio Saretto :: SSRN](#)

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Thank You



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