QES US TMT v2.0 – Risk Model Factsheet

Wolfe Research's Luo's QES team has been top-ranked in Quantitative Research, Portfolio Strategy, Economics, Accounting & Tax Policy, and ESG categories in the Institutional Investor magazine's research surveys over the past decade. We leverage our 300+ risk factor library, in-house risk model engine, and expertise in portfolio construction to deliver innovations in risk model design. QES risk models offer next generation style factors, enhanced stock exposures to styles, expanded model coverage, holdings-based factor covariances, alignment of factor portfolios & returns, and intelligent initial estimates of idiosyncratic risk. The QES risk model suite is designed to be more intuitive than conventional models for front-office decision-makers including PMs, CIOs, risk managers, and traders.

This TMT risk model uses our domain knowledge in the sector to offer more systematic explanatory power for specialists. We suggest that sector specialists consider risk through both the sector and broad market lenses.

Model Settings

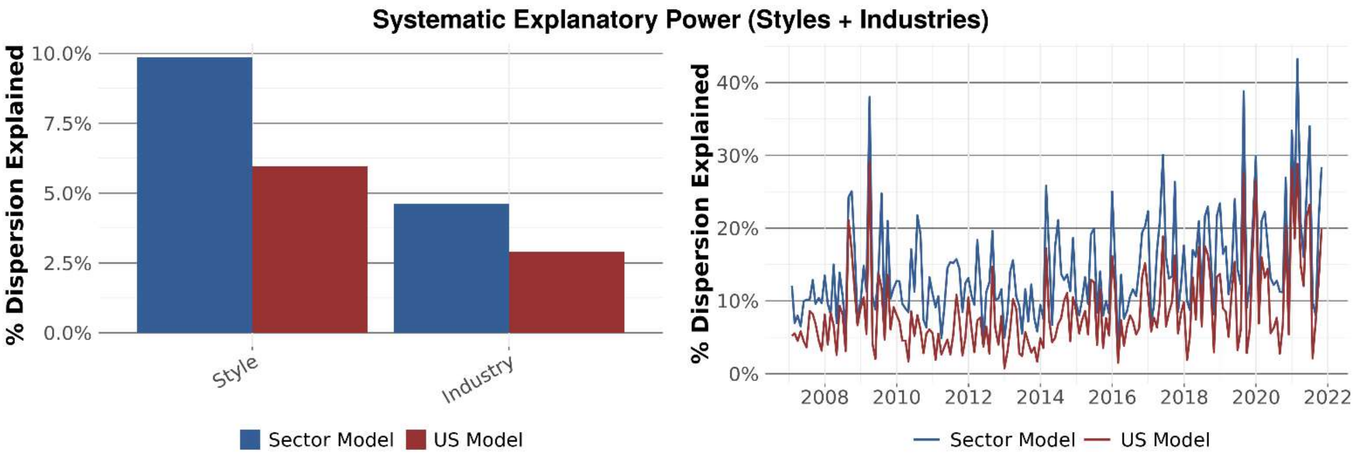
Item	Description
Risk Estimation Universe	US All-Cap TMT Equities
Model History	2007 onwards
Security Coverage	40,000+ securities
Investment Horizon	Medium-term
Variance Half-Life	84 trading days
Covariance Half-Life	252 trading days
Style Exposures	75% regression beta + 25% z-score

Factors & Descriptions

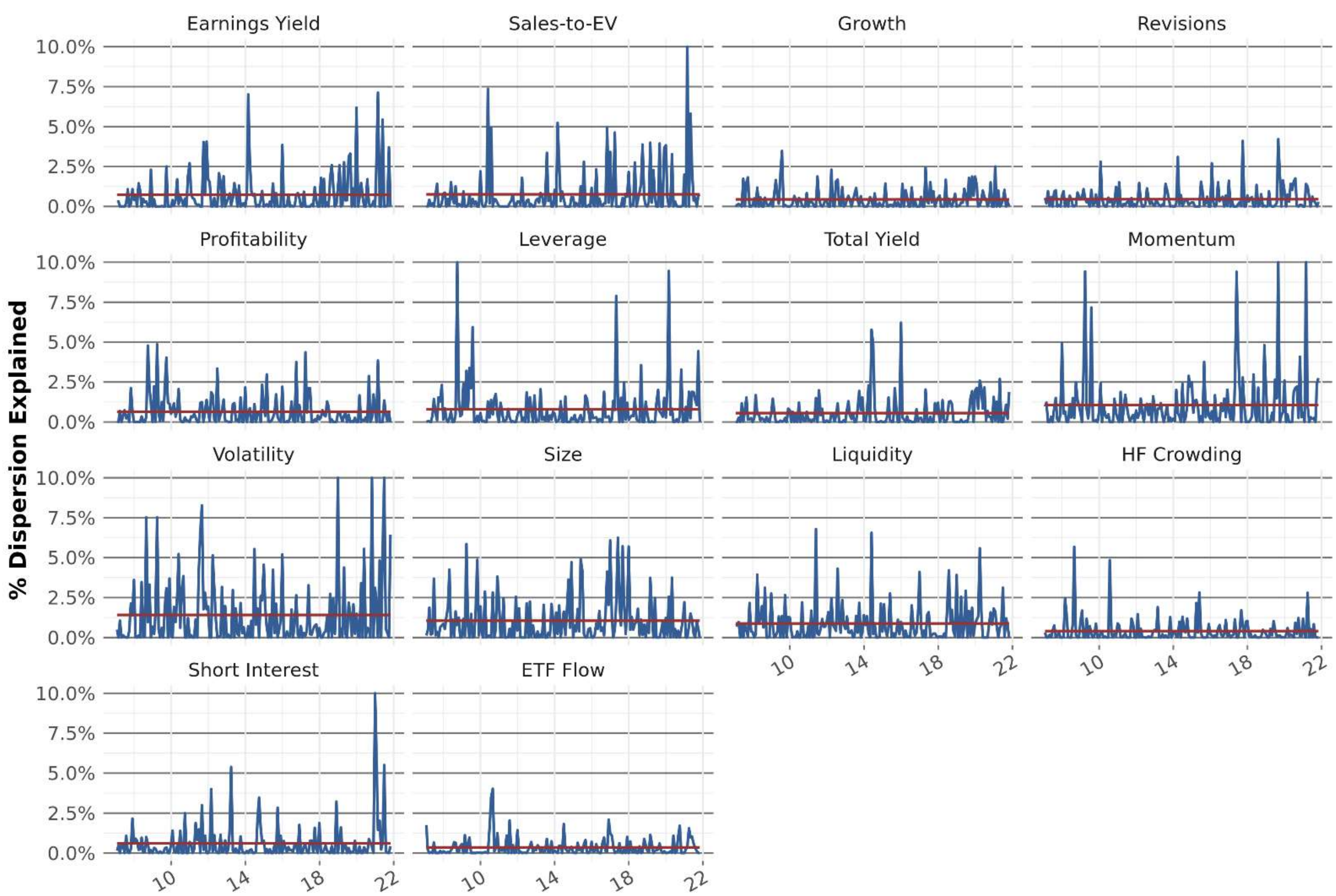
QES Factor Name	Signal Description
Earnings Yield	Next 12-month median consensus EPS divided by current share price.
Sales-to-EV	Ratio of last 12-month sales to sum of net debt, preferred shares, market cap, noncontrolling interest.
Growth	Combination of median consensus EPS growth and sales growth over the next 12-months.
Revisions	Ratio of next 12-month mean consensus sales to this metric 3-months ago.
Profitability	Combination of trailing ROE and net margin.
Leverage	Combination of debt-to-equity and debt-to-total capital at current market value.
Total Yield	Ratio of total value of dividends and buybacks less issuance over trailing 12-months to market-cap.
Momentum	Total return of the past 12-months excluding the most recent 1-month.
Volatility	Realized volatility, based on daily returns over the past 12-months.
Size	Market capitalization, common shares outstanding multiplied by the current share price.
Liquidity	Past 3-month average dollar volume divided by average market capitalization.
HF Crowding	Combination of hedge fund intensity (% of float) and level (market value) based on 13F filings.
Short Interest	Ratio of shares borrowed for shorting to inventory available for lending.
ETF Flow	Change in ownership (as % of float) by US-listed equity ETFs over the prior 3 months
QES Industries	Binary one or zero values identifying each stock's QES Industry classification.

Sources: Wolfe Research Luo's QES. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

Explanatory Power for Opportunity Set



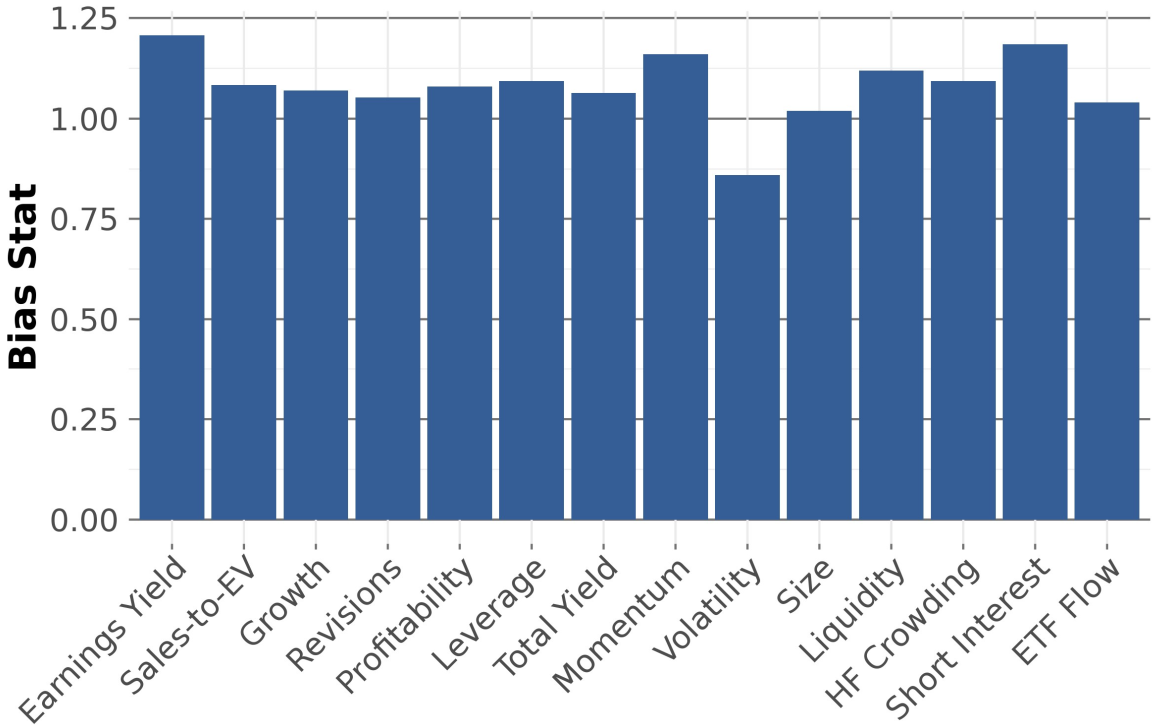
Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.



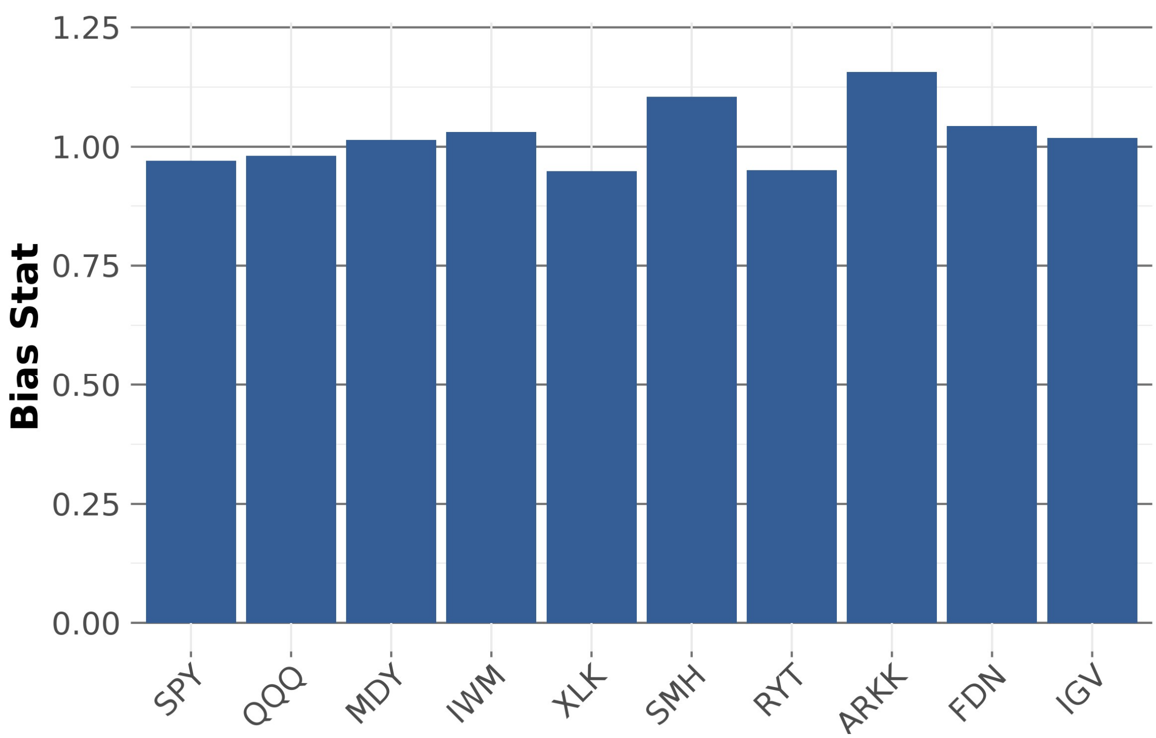
Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

Bias Statistics

* Bias Stats for Style FMPs



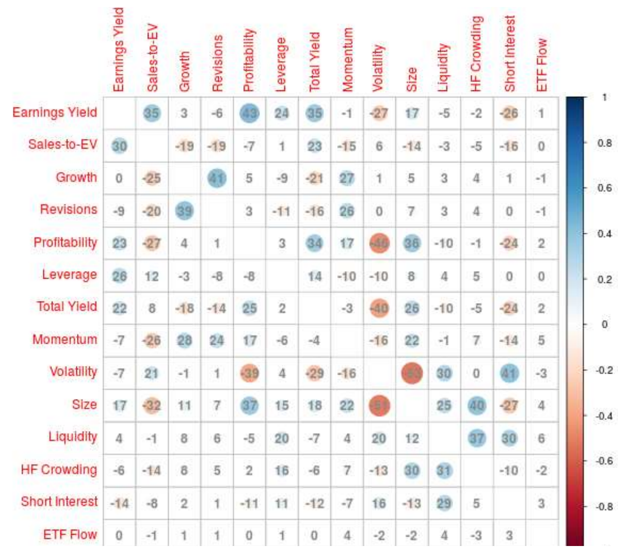
* Bias Stats for ETFs



Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future. Note: ARKK bias stat only covers the time period from March 2020 to present.

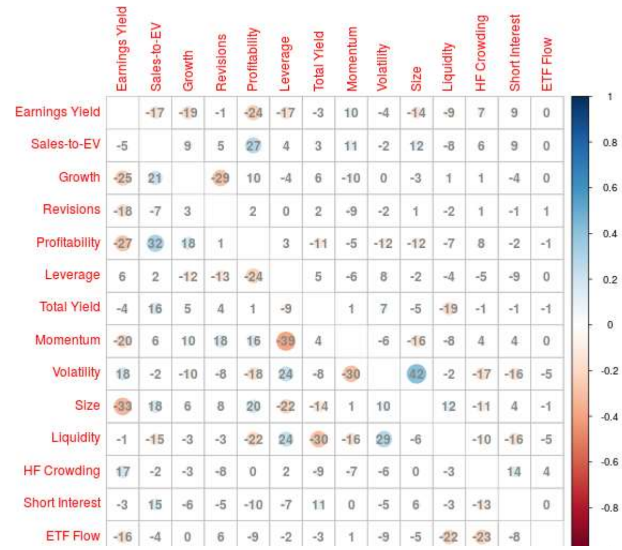
Factor Correlations

*Signal Rank (Upper) and Exposure Rank (Lower)



Portfolio Optimization Tests

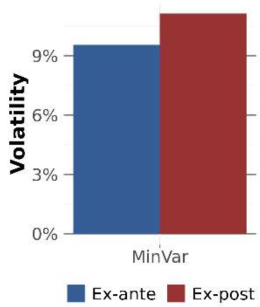
* FMPs Ex-Ante (Upper) and FMPs Ex-Post (Lower)



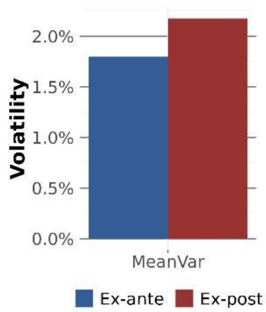
Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

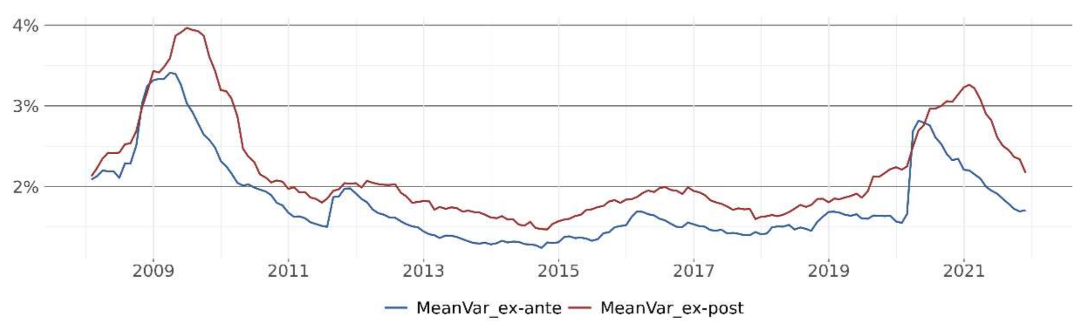
Portfolio Optimization Tests

*Minimum Variance



*Mean-Variance

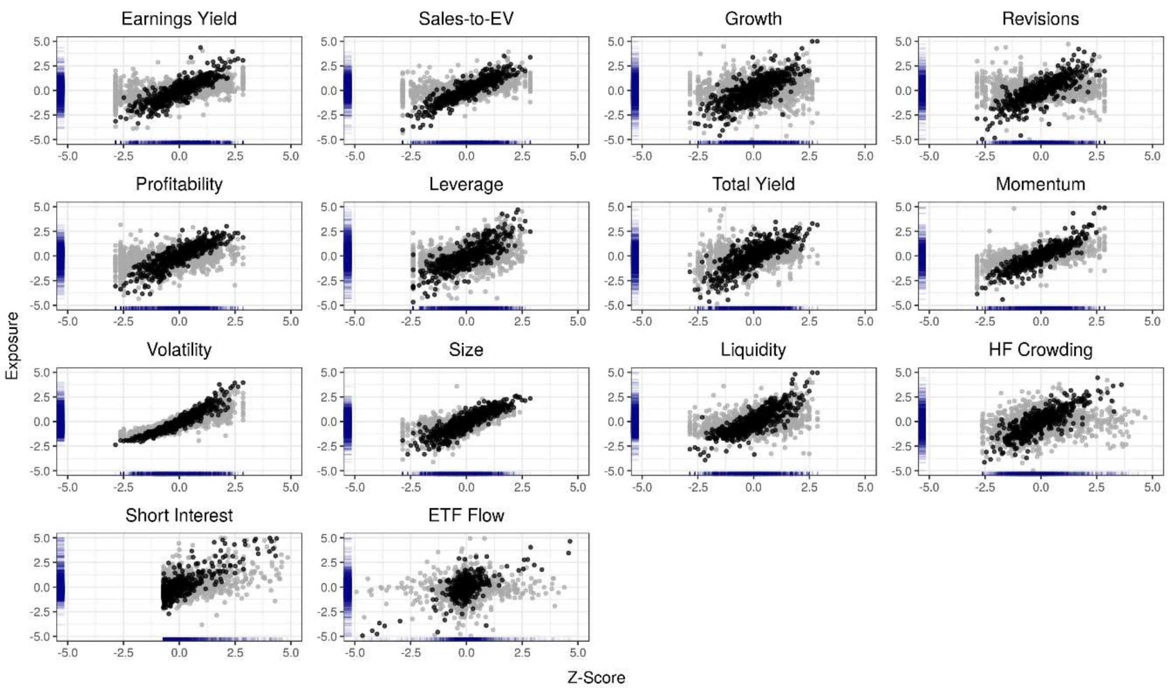




Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

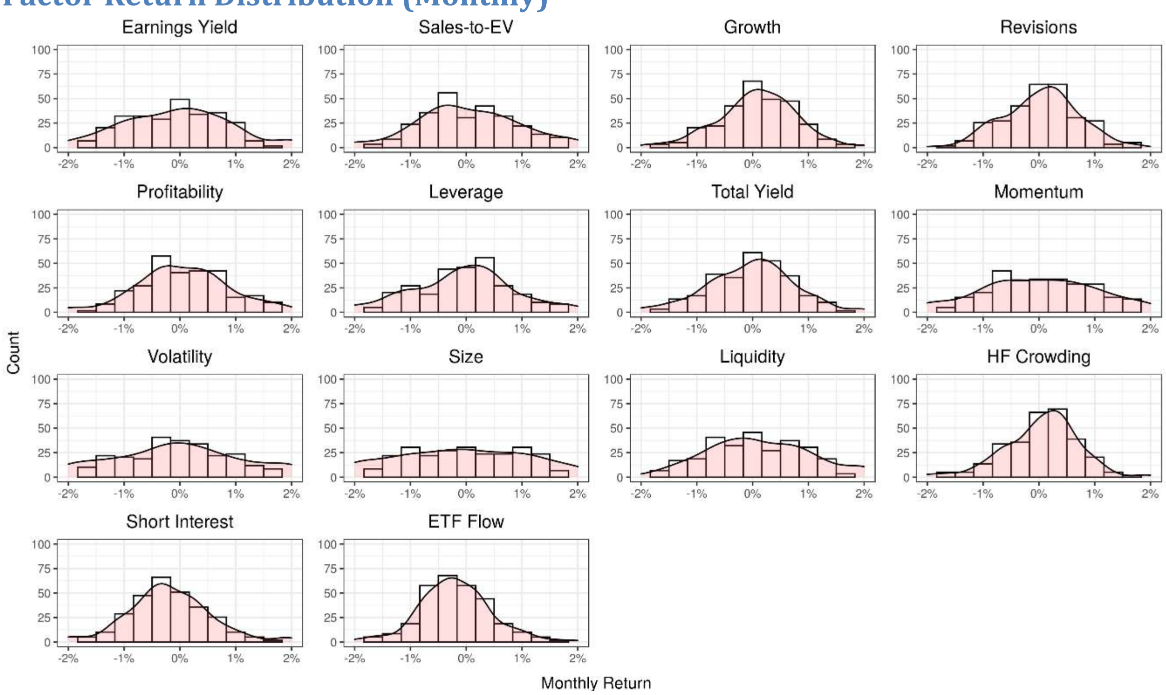
Exposure Distribution (Current)

*In Sector (Black) and In Universe (Grey)



Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

Factor Return Distribution (Monthly)



Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

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