

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

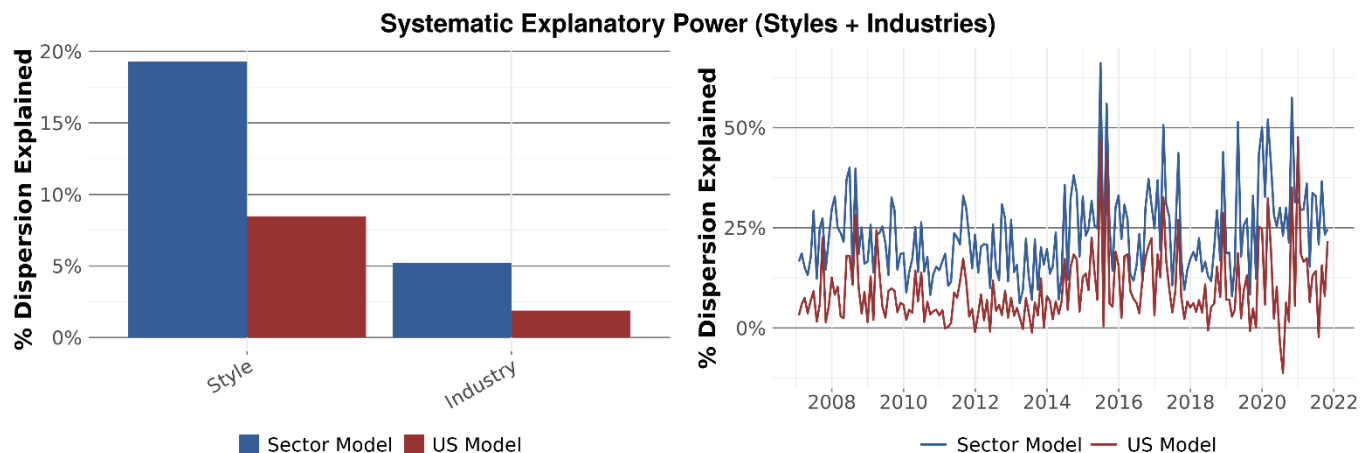
### Factors & Descriptions

QES Factor Name	Signal Description
<b>FCF Yield</b>	Total unlevered free cash flows of last 12-months divided by market capitalization.
<b>EBITDA-to-EV</b>	Ratio of last 12m EBITDA to sum of net debt, preferred shares, marketcap, noncontrolling interest.
<b>Growth</b>	Median consensus growth in cash flow per share over the next 12-months.
<b>Revisions</b>	Ratio of next 12-month mean consensus EBITDA to this metric 3-months ago.
<b>ROIC</b>	Ratio of trailing 12-month income before extraordinary items to invested capital.
<b>Debt-to-EBITDA</b>	Ratio of total debt to last 12-month EBITDA.
<b>Dividend Yield</b>	Trailing 12-month dividend per share divided by current share price.
<b>Momentum</b>	Total return of the past 12-months excluding the most recent 1-month.
<b>Volatility</b>	Realized volatility, based on daily returns over the past 12-months.
<b>Size</b>	Market capitalization, common shares outstanding multiplied by the current share price.
<b>Liquidity</b>	Past 3-month average dollar volume divided by average market capitalization.
<b>Interest Rates</b>	Beta to interest rate changes for US Treasuries approximately equivalent to the 10Y.
<b>Oil Prices</b>	Beta to weekly returns of crude oil WTI Futures TR after controlling for market beta.
<b>NatGas Prices</b>	Beta to weekly returns of natural gas NG Future Commodity.
<b>HF Crowding</b>	Combination of hedge fund intensity (% of float) and level (market value) based on 13F filings.
<b>Short Interest</b>	Ratio of shares borrowed for shorting to inventory available for lending.
<b>ETF Flow</b>	Change in ownership (as % of float) by US-listed equity ETFs over the prior 3 months.
<b>QES Industries</b>	Binary one or zero values identifying each stock's QES Industry classification.

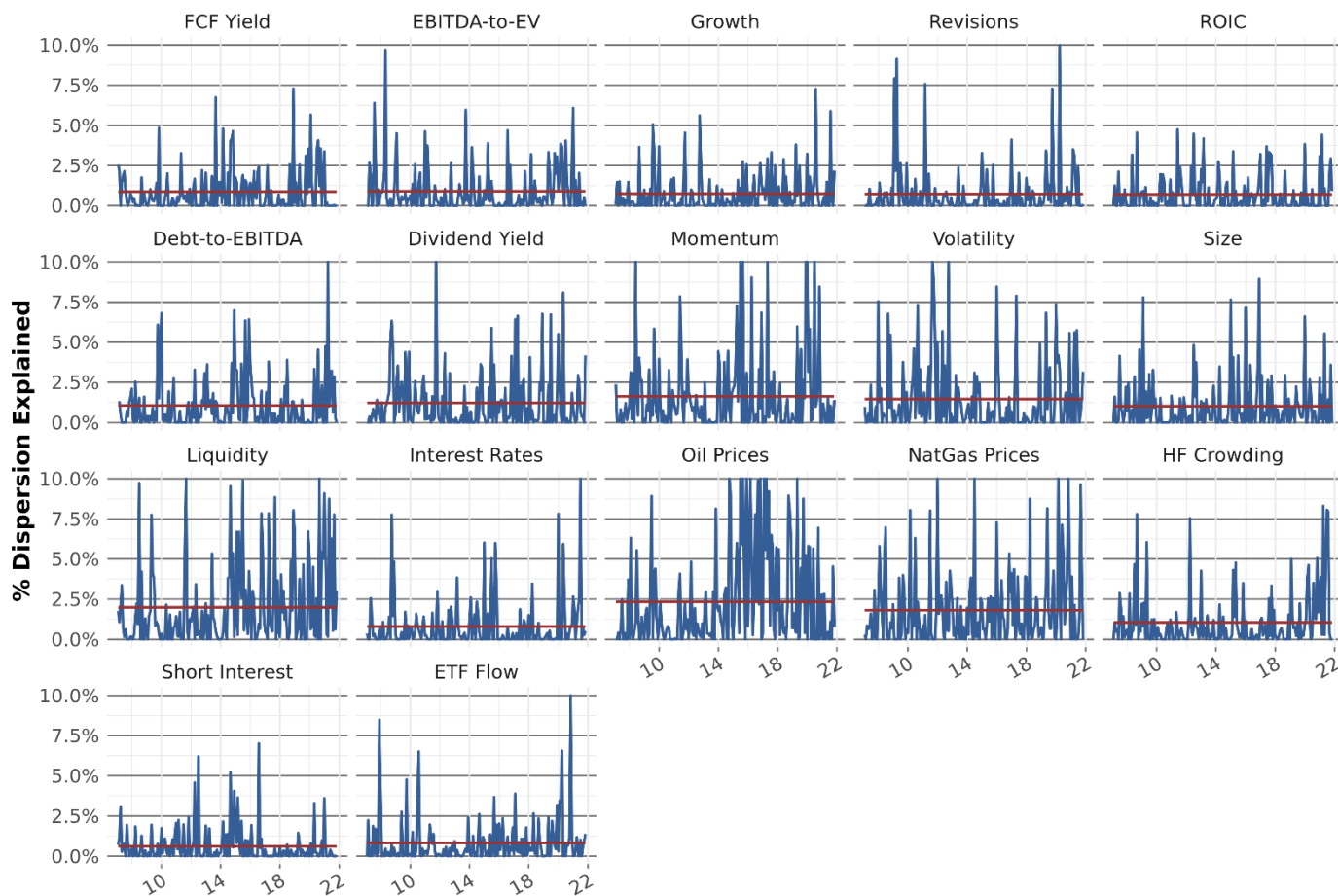
Sources: Wolfe Research Luo's QES. Dec 1, 2021. Past performance results do not guarantee similar results in the future.

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## Explanatory Power for Opportunity Set



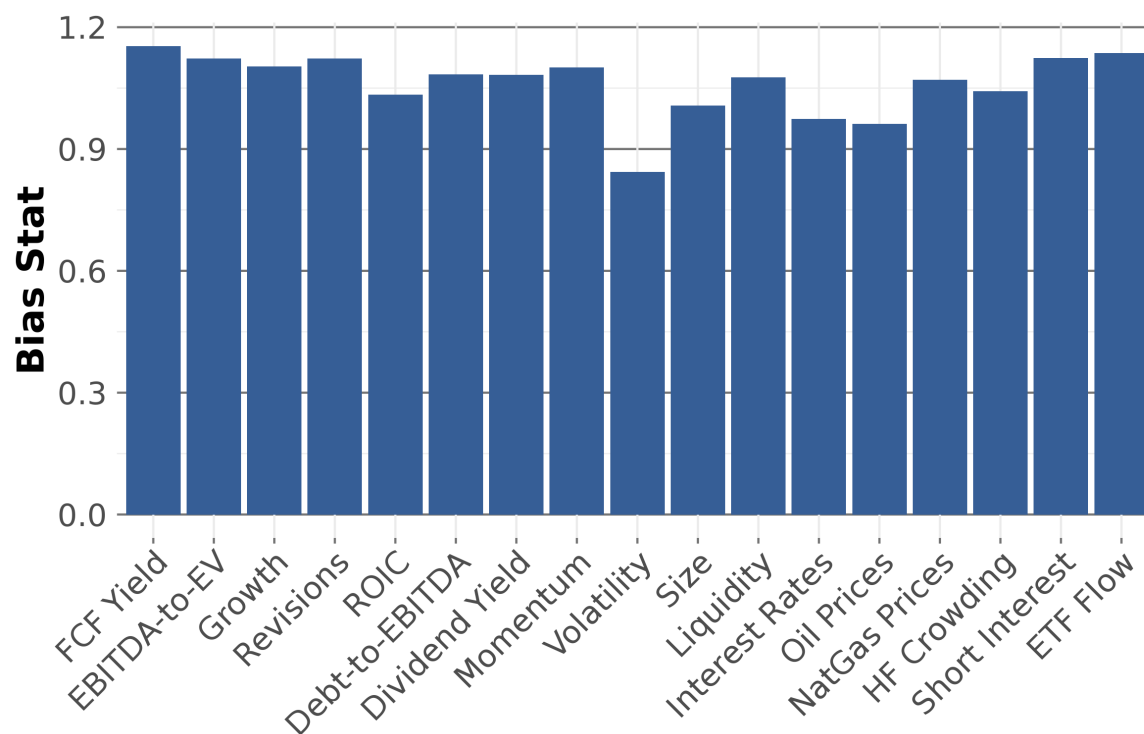
Sources: Wolfe Research Luo's QES, Bloomberg Finance LLP, FactSet, FTSE Russell, MSCI, Refinitiv, S&P Global. Dec 1, 2021. Past performance results do not guarantee similar results in the future.



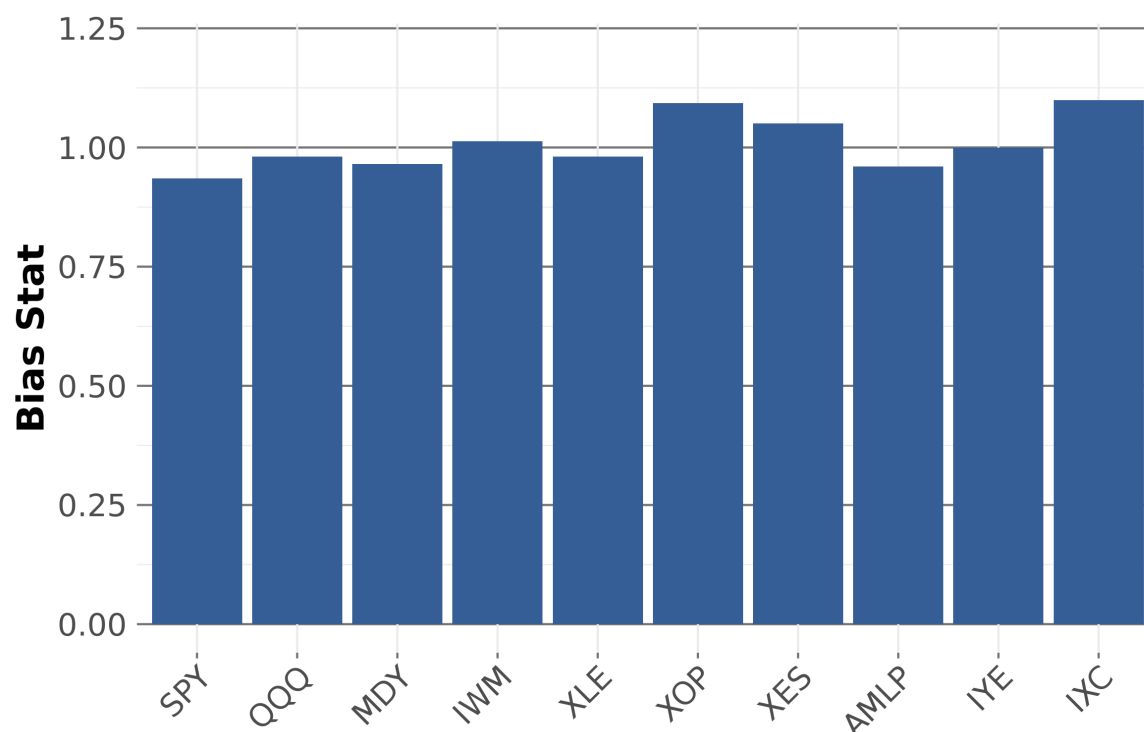
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## Bias Statistics

\* Bias Stats for Style FMPs



\* Bias Stats for ETFs

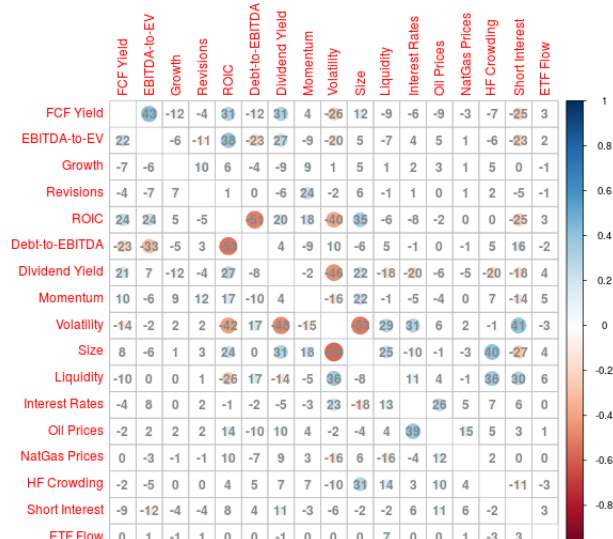


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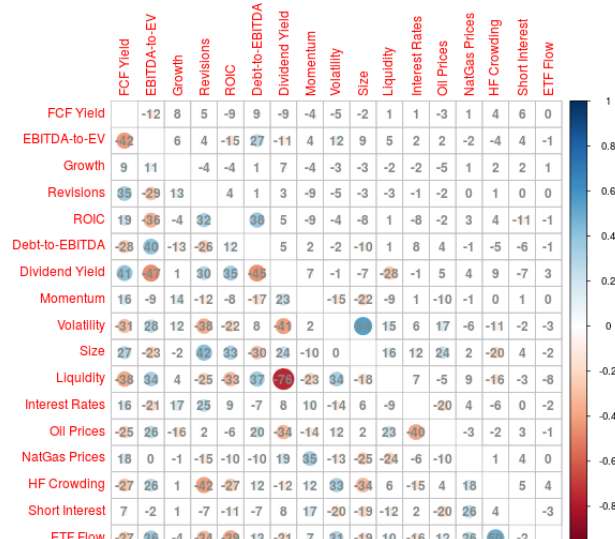
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## Factor Correlations

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



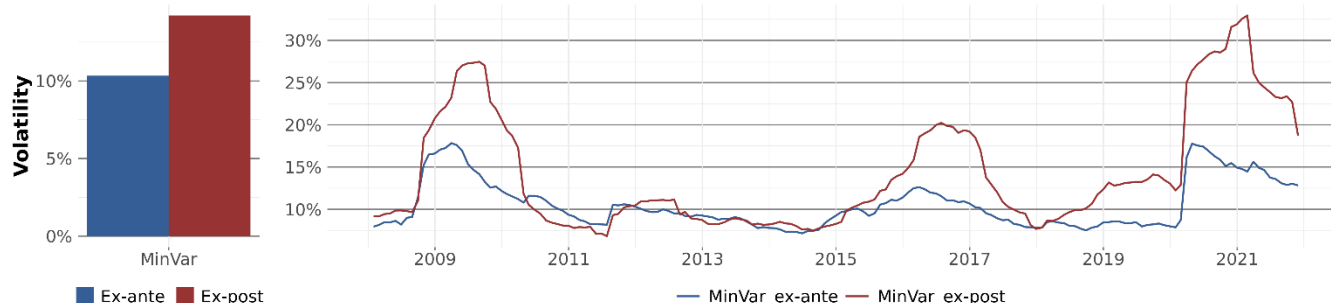
\* FMPs Ex-Ante (Upper) and FMPs Ex-Post (Lower)



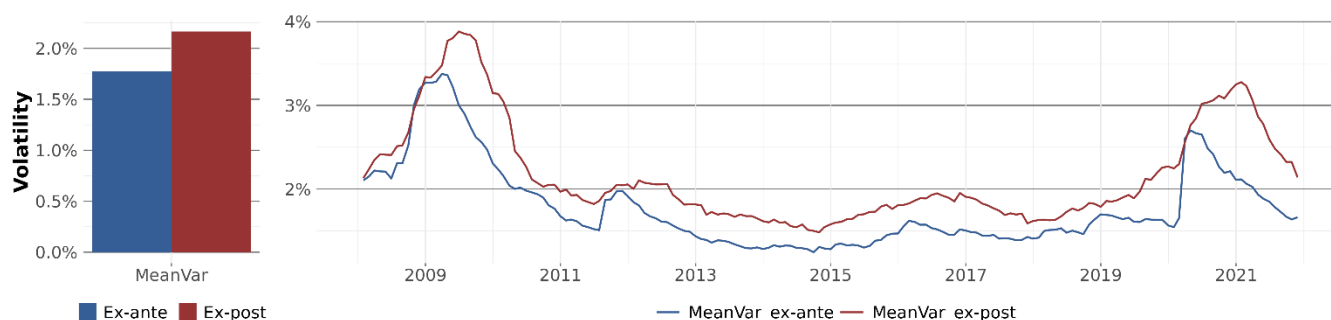
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## Portfolio Optimization Tests

\*Minimum Variance



\*Mean-Variance

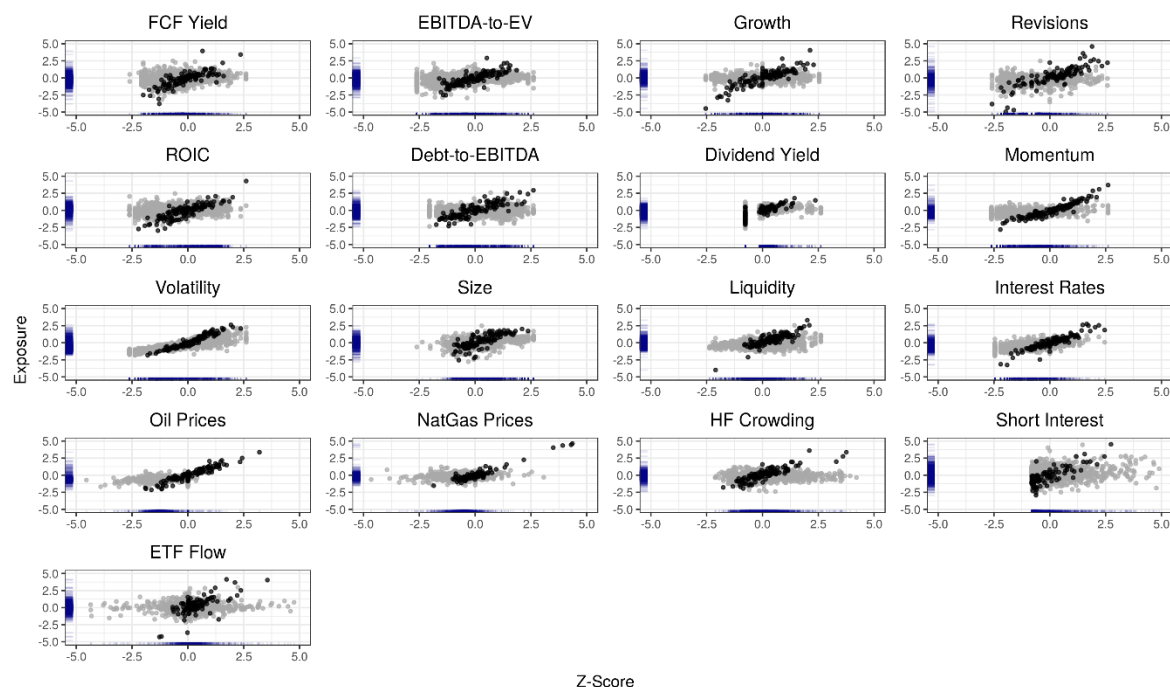


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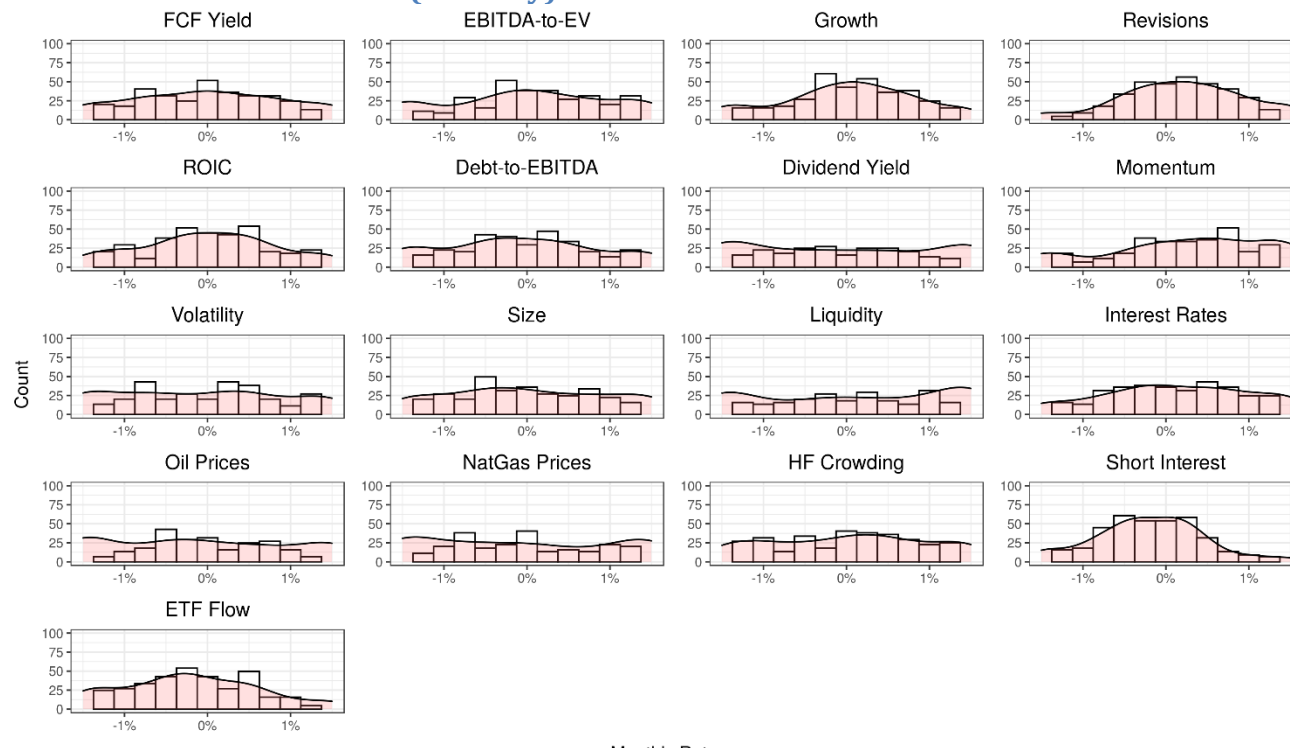
## Exposure Distribution (Current)

\*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)



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