

Introduction to Macro Risk:

A New Edge for Equity Asset Managers



March 2025

1. Background

This piece introduces how macroeconomic factors materially shape equity risks and returns. It also discusses how investors can deal with macro in an easy to interpret, consistent and repeatable way and what this looks like in practical terms.

It is aimed at asset managers seeking fresh perspectives on factor-based risk and how a macro framework can complement existing fundamental models.

It is well accepted that there is a macro-market relationship. However, for many years it has been challenging to bridge the gap between theory and practice.

Two things have happened over the last decade to enable effective, practical solutions:

Firstly, data availability has improved substantially. For example, it is now possible to obtain daily real GDP and inflation estimates. In short, there are a multitude of high frequency variables that capture macro.

Secondly, compute power has become so cheap that it is now possible to employ data science techniques that strip out the noise and allow extraction of the deeper macro-market relationships. One of the challenges with macro factors is that they are often correlated. These overlaps in the data needs to be removed in order to identify the independent effects of a single macro factor on an index, sector or stock.

We note also that the need for a macro lens on equities has increased sharply as the world exited a period of benign inflation, rates stuck at zero and relatively low geopolitical uncertainty. Indeed, the events of 2020 and 2022 demonstrated the impact that macro shifts can have on equity styles, themes and even single stocks, some of which have a greater gearing to macro factors.

Aside from asset managers, there is also a growing interest among allocators in understanding if the returns of the funds they are invested in are coming from bottom up alpha or implicit and often inadvertent exposures to macro.

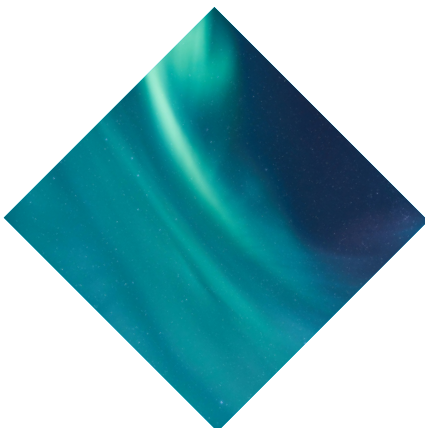
The net result of all this is that macro risk is at minimum becoming a talking point among equity portfolio managers and risk managers, and we hope this guide is a useful review of recent advances and where that leaves the landscape.

2. Why Macro Matters

The connection between macro and equities can be explained by decomposing equity returns into three components:



$$1) \text{ Equity Returns} = \Delta \text{ Earnings} * \Delta \text{ P/E}$$



2) Earnings Changes

- Slow moving
- Changes typically driven by company announcements / earnings calls
- Analyst Consensus – one / two years forward at most
- Macroeconomic impact on PnL

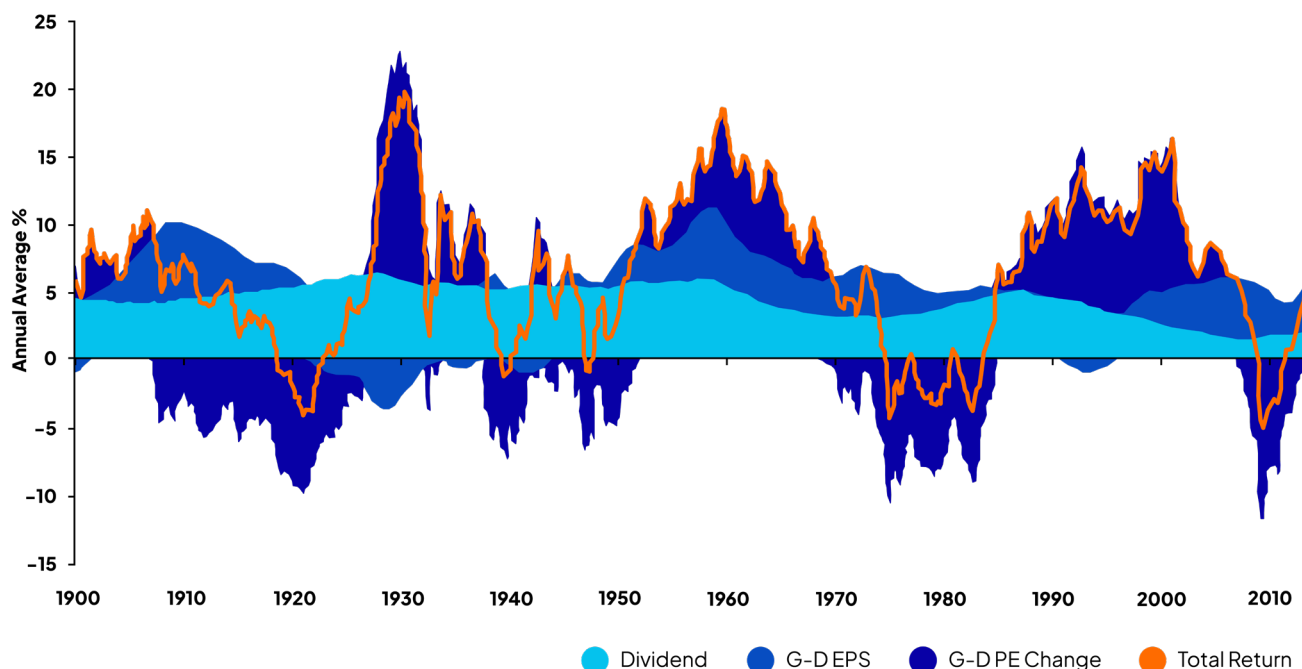


3) P/E Changes

- Fast moving – reflect tick-to-tick price moves => need for higher frequency data
- Driven by Macro which changes rapidly
- Encompasses three key macro aspects:
 - Economic Growth and Inflation – valuing growth
 - Financial Conditions – determining the discount rate, especially for terminal value
 - Risk – discounting for risk and uncertainty; geopolitical risk, macro and market volatility

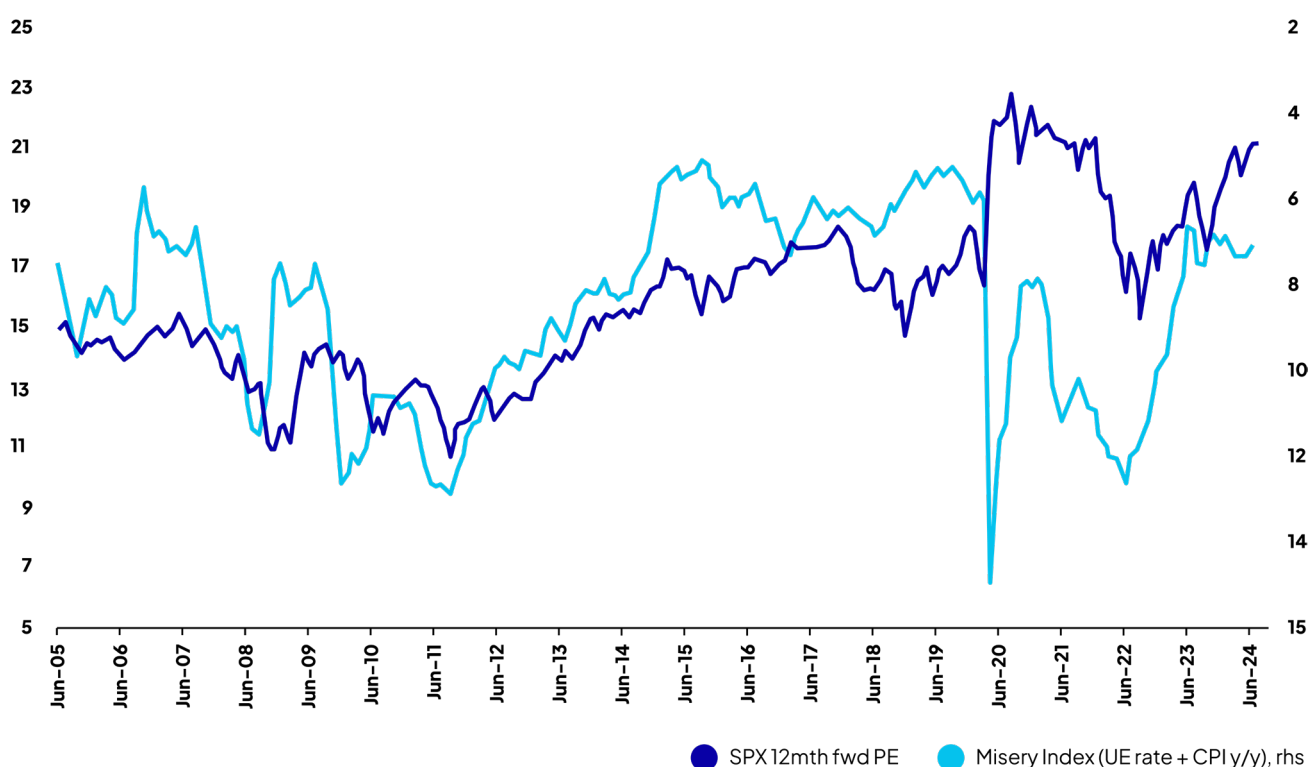
We can also see clearly that it is multiples that are the biggest driver of returns – the most significant part of return variation is valuation (P/E multiple), not earnings.

Decomposition of Rolling 10yr S&P 500 Annualised Return

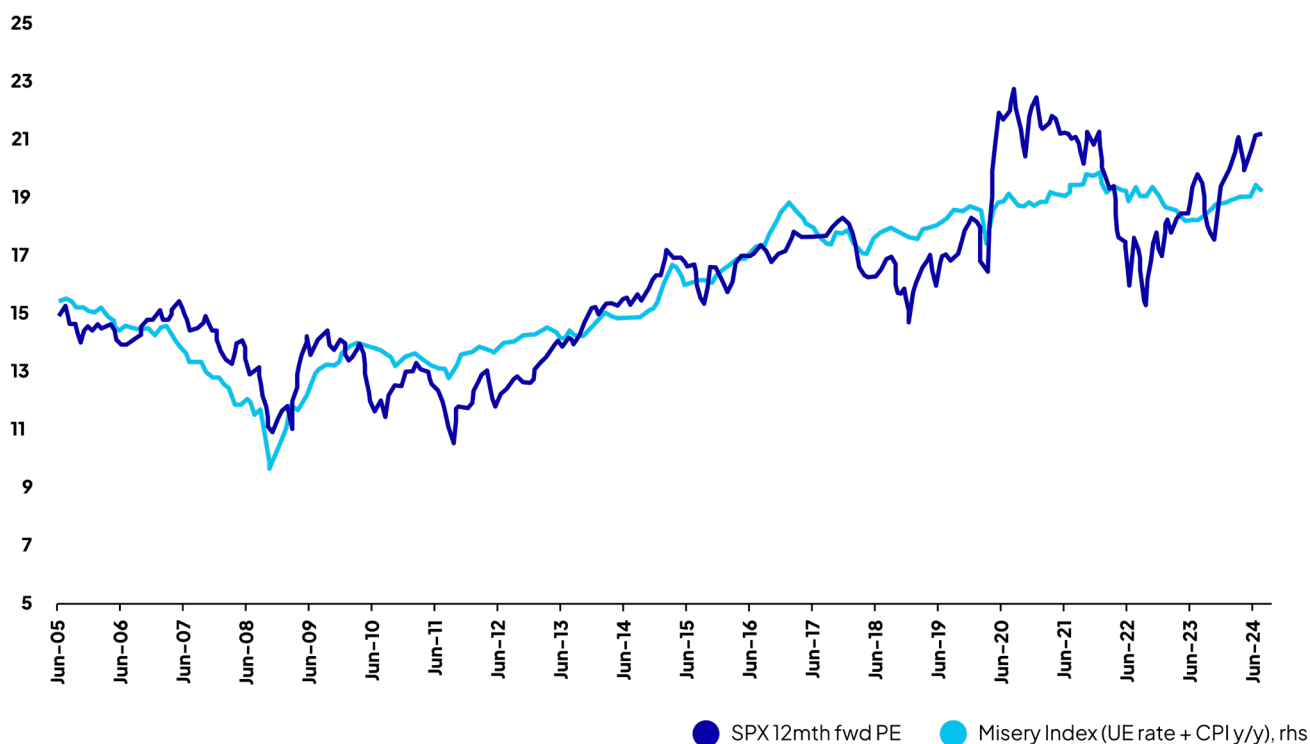


And to complete the circle, we can see that multiples track business cycle dynamics.

S&P 500 12mth fwd PE modelled on Misery Index



S&P 12mth fwd PE modelled on financial conditions: BAA Corp Spreads, 5yr Real Yield, Trade-Weighted Dollar



3. Defining Macro

As described above there are three broad categories of macro factors that matter for equities. It can be a challenge to define a set of macro factors that is not so broad that there is too much overlap and confusion, but not so small that key information is missing. Our research indicates that the following is comprehensive yet easy to interpret, and may hopefully serve as a useful guide.

1) Macro Fundamentals (valuing “growth”):

- a. Real GDP growth
- b. Inflation
- c. Commodity Prices (impact inflation)
- d. Forward growth expectations

2) Financial Conditions:

- a. Real interest rates
- b. Nominal interest rates
- c. Credit spreads
- d. Central Bank rate expectations
- e. Central bank QE/QT expectations
- f. Currency trade weighted (stronger currency is a tightening of financial conditions)

3) Risk appetite:

Global investor risk aversion or fear can be measured by equity market implied volatilities, the gold/silver ratio or other variables.

4. Macro Factor Models: Methodology Challenges

The objective of a macro factor model is to connect equity returns to macro factor returns. The basic model structure is:

$$\text{Stock return \%} = [\text{Exposure to macro}] * \text{Macro factor return \%} + \text{“Noise”}$$

This is a time series approach. In the case of macro, the macro factor returns are given, as is the stock return. The objective of the model is to estimate the macro Exposures.

The “Noise” term represents everything other than macro in the total stock return.

In order to run this type of model one needs to overcome certain challenges:

Factor frequency: Daily data is required for everything. In this way one can create a macro model that connects daily stock returns to daily macro factor returns. Daily real GDP estimates are now available as are daily inflation estimates.

Forward looking: Equity markets are often less impacted by current data on GDP and inflation, and more impacted by expectations. One needs GDP growth, inflation and interest rate expectations in the mix as well.

Correlations: The biggest methodological challenge is dealing with the fact that macro factors are correlated. Standard multiple regression techniques will produce biased and inaccurate estimates. A method is therefore needed to de-correlate (“orthogonalize”) the factors to strip out overlaps in the data

Stability: Another key requirement is stable exposures over time. Exposures can and do change, but they do so relatively gradually. Results that are noisy are far from ideal.

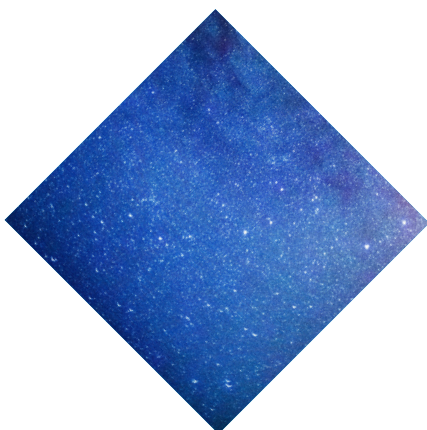
Out-of-sample testing: Exposures estimated from the model should be tested out-of-sample to give some confidence that the model derived exposures are accurate estimates of the true macro exposures of indices, sectors and stocks.

If all these methodology challenges are resolved, what one finds is a number of interesting results including the following:



Macro is ubiquitous:

Even the most “fundamental” equity portfolios experience meaningful swings tied to macro drivers such as GDP growth, interest rates and inflation.



Data-driven evidence:

In depth analysis shows that macro factors can explain on average over 35% of single-stock daily returns and 50%+ of equity index daily returns in shorter horizons such as 3 months, especially during market stress.



Dynamic exposures:

Macro linkages shift over time (e.g., a stock that once benefitted from rising inflation might later be negatively exposed to the same factor). Traditional static factor models often miss these changing relationships.

5. Fundamental Factor Models vs. Macro Factor

A summary of some of the main differences between fundamental (style) factor models and macro factor models is set out below. It is important to note that they are complementary. Style and macro factor models are typically used side by side, but there is also growing interest in integrating them to produce a single overarching factor framework.

Fundamental (Style) Models

- Cross-sectional: Focus on intrinsic characteristics (Value, Growth, Size, Quality, etc.).
- Strength: Well-established, widely adopted, effective over medium-to-long horizons.
- Limitation: Macro drivers are often lumped into “residual” risk, potentially obscuring important environmental exposures.

Macro-Factor Models

- Time-series: Uses real-world macro variables (daily real GDP estimates, interest rates, FX, commodities, etc.).
- Strength: Captures shorter-term 1 – 6 month market sensitivity to economic regimes; dynamic relationships.
- Limitation: Historically underutilized for equity risk, given complexity, high collinearity, and data frequency challenges.

Both these complementary lenses together reveal a fuller picture of what truly drives portfolio outcomes.

6. Macro Factor Equity Risk Model (MFERM)

As an example of a modern macro solution, we show some examples from Qi's MFERM. It is the product of extensive R&D and collaboration with buy and sell sides. It may be helpful in providing a good idea of what a modern macro factor solution looks like.

1) Core Idea:

Decompose equity returns into “macro factor-driven” vs. “specific” (idiosyncratic) components on a daily basis.

2) Macro-Factor Models

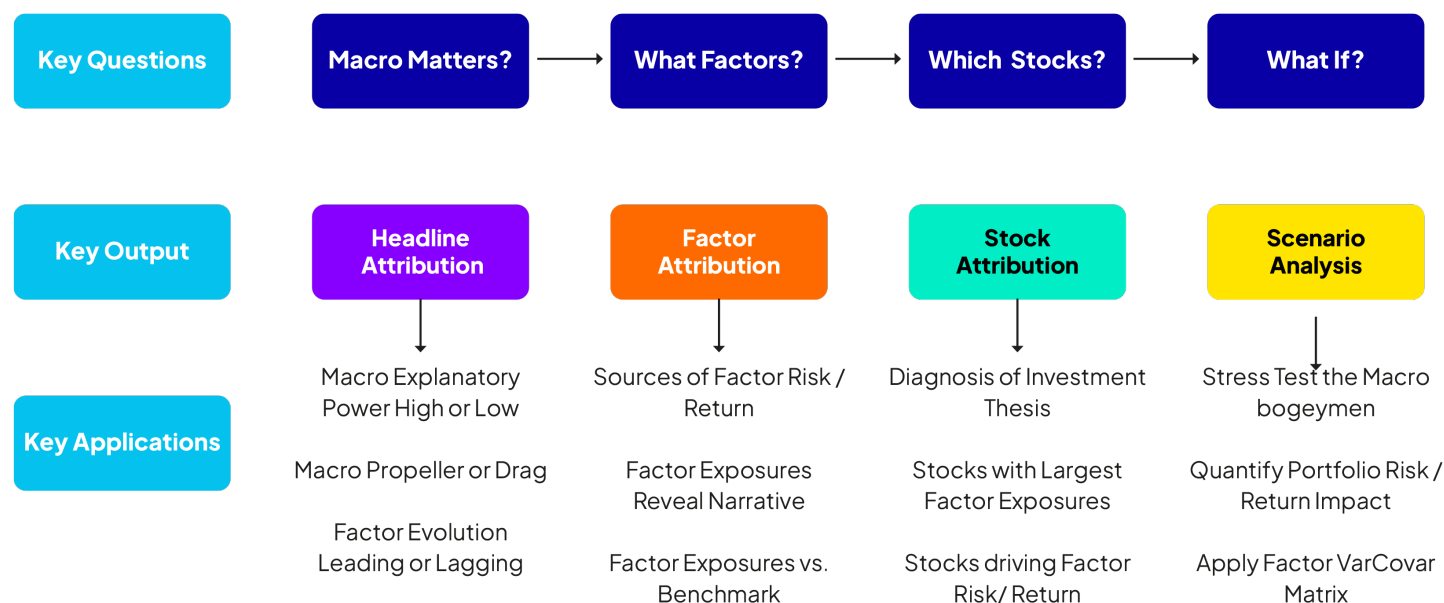
- Uses Partial Least Squares Regression (PLSR) to handle collinearity among macro factors (credit spreads, inflation, etc.).
- Daily updates reveal how each stock or portfolio currently responds to shifts in macro conditions.

3) Outputs

- Portfolio Exposure: Stock level sensitivity to each macro factor can be aggregated to produce overall portfolio macro exposure
- Return Attribution: Decompose fund performance into macro and non-macro. What portion of return is alpha versus macro? Break down the macro component into individual macro factor contributions.
- Risk: A portfolio expected volatility (risk) is calculated from a variance-covariance matrix of macro factor returns
- Risk Attribution: Identify Which factors are raising or dampening volatility

Macro Factor Equity Risk Model (MFERM)

While the focus above is at the portfolio level, all these outputs are available for indices, sectors and stocks. This enables an assessment of macro alongside fundamental factors when considering adding or subtracting a position from the portfolio.



7. Sizing Macro's Share of Risk & Return Models

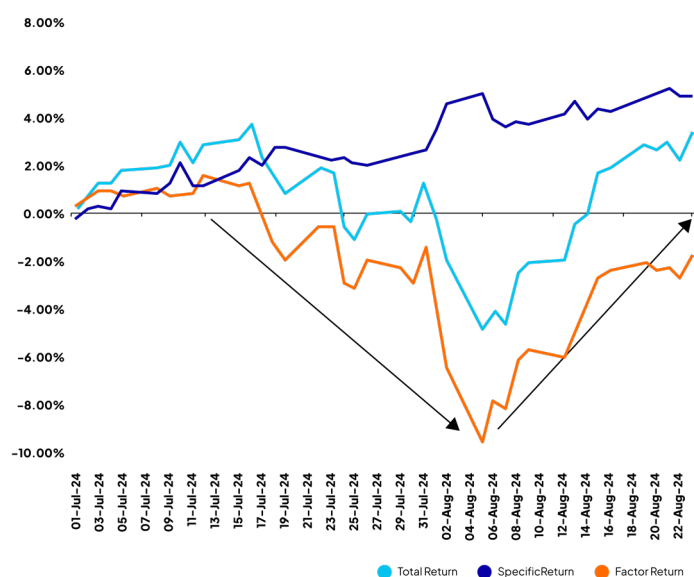
High-Level Finding:

Macro can dominate at turning points. For instance, during major drawdowns or regime shifts (e.g., COVID sell-off), macro factors often explain the bulk of the short-term market move.

Rolling correlations:

Studies show correlation between factor returns and spot returns tend to be significant most of the time. This is because macro tends to be a major source of return volatility. Correlations can surge above 70% during macro-driven markets, then ebb when fundamentals regain control.

SPY Return Attribution since 16th July



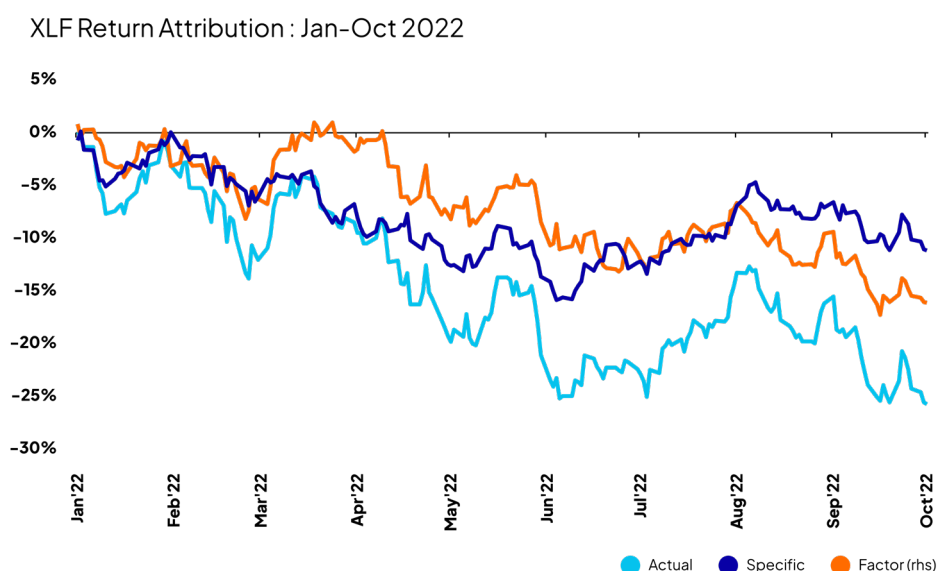
SPY Actual Daily Return vs. SPY Factor Daily Return
3mth Rolling Correlation



8. Real-World Examples in Action

1) XLF Financial Sector ETF: 26% Correction (Jan–Oct 2022)

- Half of the drawdown was attributed to macro factors—chiefly wider HY credit spreads, stronger dollar, and slowing growth.
- Highlights how a sector can be blindsided by external conditions, not just its own fundamentals.



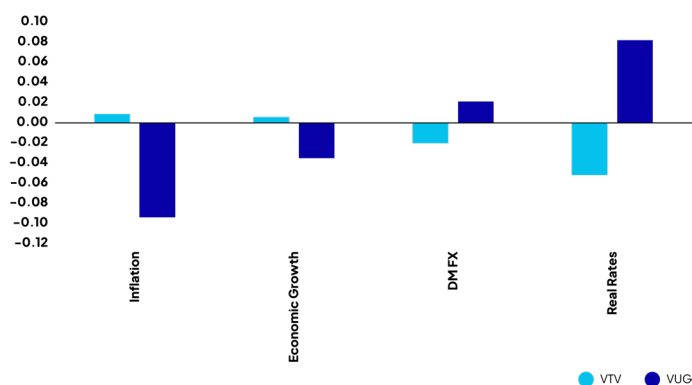
Factor Return Attribution:
12-Jan-22 to 12-Oct-22

Attribution	% Return
CB OT EXD	1.9%
CB Rate Exp	-1.4%
Corporate Credit	-12.1%
DM EX	-8.5%
Real Rates	6.0%
10Y Yield	2.6%
Financial Conditions	-12.11%
Economic Growth	0.13%
Energy	2.11%
Forward Growth Exp	-1.66%
Inflation	-0.28%
Metals	-1.02%
Growth Expectations	-0.75%
Risk Aversion	-3.31%
FACTOR Return	-15.66%
SPECIFIC Return	-10.10%
SPOT Return	-25.81%

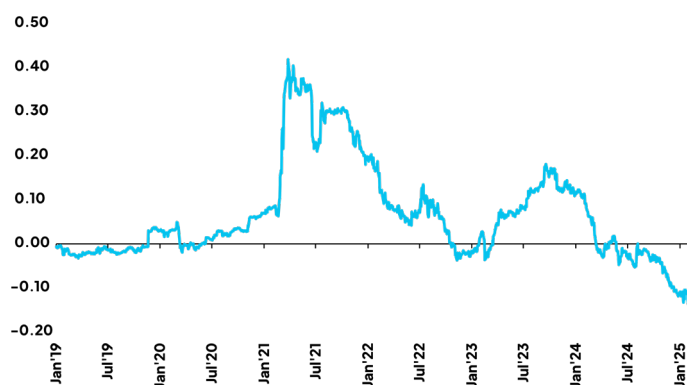
2) Style Funds (Growth, Value, Quality, Momentum)

- **Fundamental lens:** Industry and style tilts (Size, Quality, etc.) dominated risk at times.
- **Macro lens:** Large swings in inflation expectations and credit spreads explained major return divergences—especially for Growth (negatively exposed to higher inflation) and Momentum (sensitive to tighter credit).

VTV vs. VUG: Major Macro Factor Sensitivity Differences
(% chg for 1std dev daily move higher in factor)



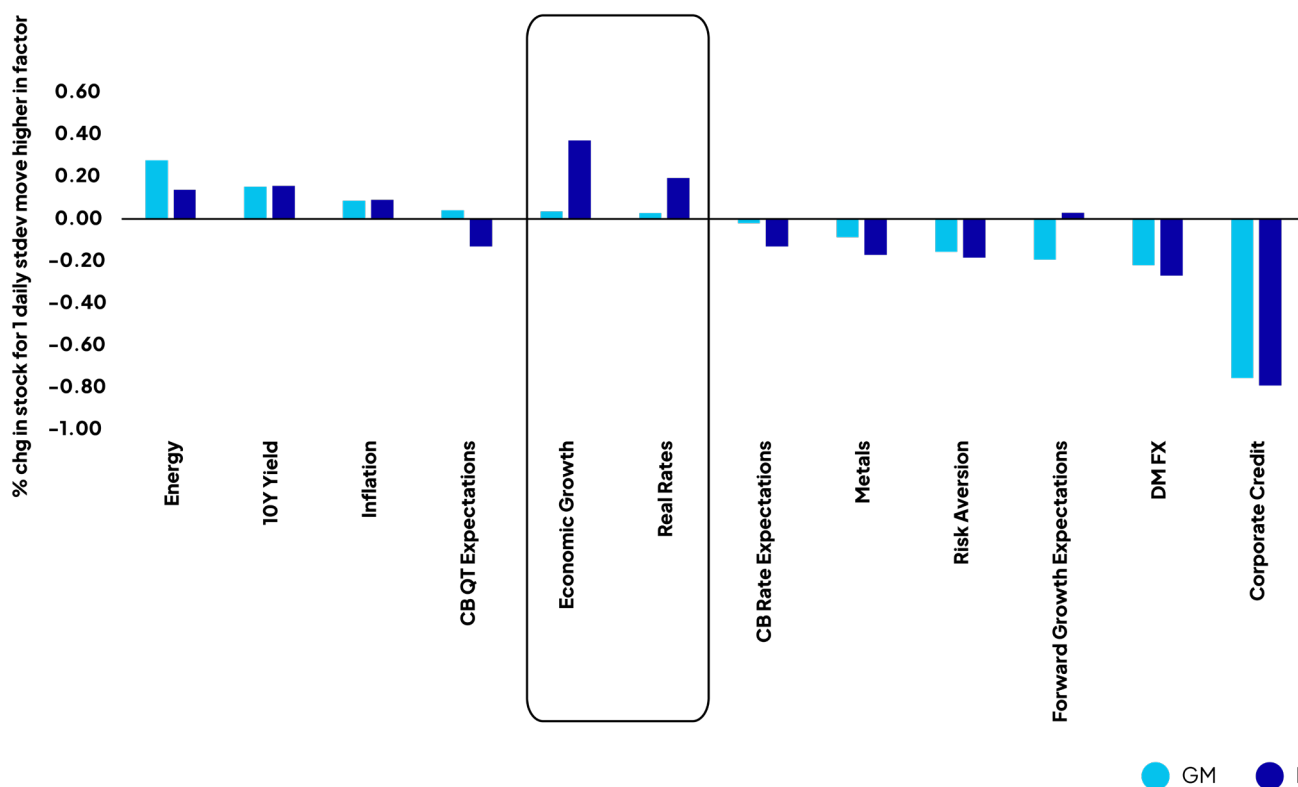
VTV vs. VUG: Real Rates Factor Sensitivity Difference
(% chg for 1std dev daily move higher in factor)



3) A simple long/short pair example: Ford vs. GM

- Presumed “pure alpha” trade with market/sector netted out.
- Macro model showed Ford had a stronger positive beta to economic growth and real rates vs. GM, creating unintentional macro bets.

Qi MFERM: Macro Exposure Sensitivities of F & GM



8. Stress Testing With Macro

Stress testing and scenario analysis that produces sensible, realistic results rests upon having a variance-covariance matrix of macro factor returns. For example, when considering a shock such as a major weakening of the US Dollar, it is important to take into account correlations with other factors. A sharply weaker USD typically increases inflation expectations. If a portfolio has positive exposure to both USD and inflation, then this correlation will dampen the impact on the portfolio from a USD depreciation.

Correlations shift over time, which is why the variance-covariance matrix needs to be updated daily. It is also advisable to give a higher weight to more recent observations so that embedded assumptions on market dynamics are up to date.

Here is an example that looks at the impact of a significant credit spread widening on Tesla stock. We also show a ranking of S&P500 stocks' exposures to a widening of credit spreads to highlight the variation among stocks.

Scenario Design:

Historical replay (e.g., 2018 US-China trade war) or "what-if" shock (50 bps credit spreads widening).

Uncorrelated or correlated:

Apply single-factor or multi-factor shocks consistent with factor covariance.

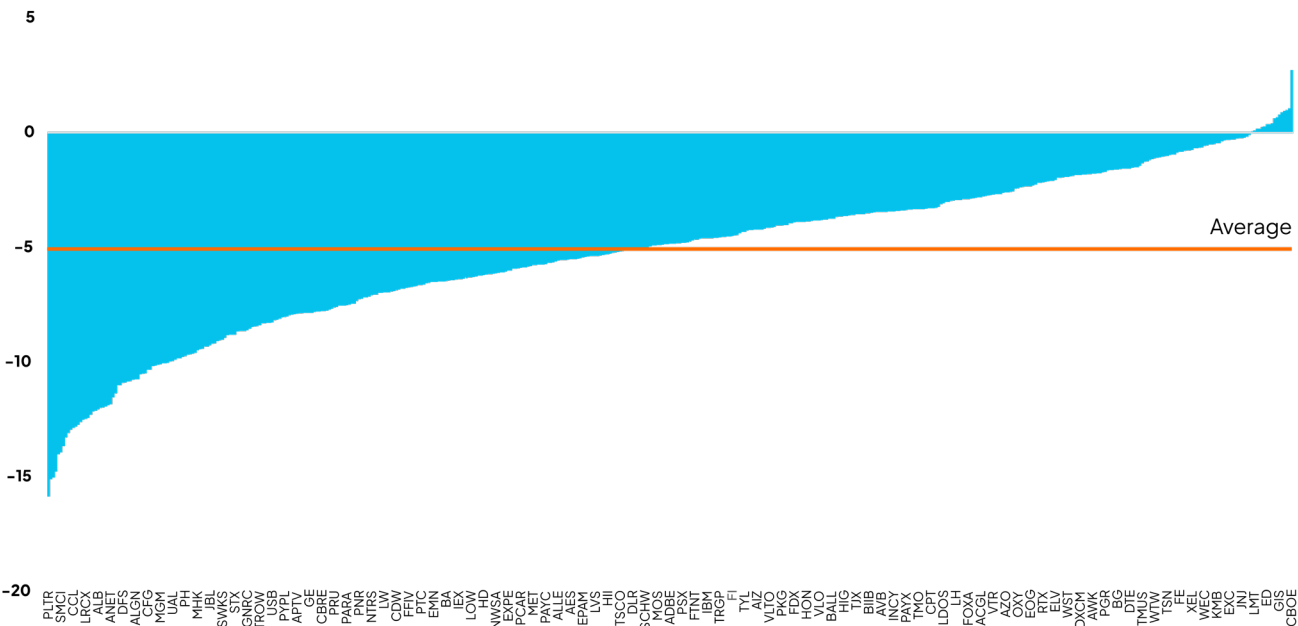
Outcome:

Quickly see how a specific portfolio or security might fare if credit spreads spike or global growth falters, etc.

Shocking Tesla with Vol-Adjusted Factor Moves seen in Q4 2018:

	Vol-adjusted Factor Returns (2018-10-03 to 2018-12-24 in std)	TSLA Raw Exposures (2025-02-05 in %/ std)	Shock*Exposures
CB QT Expectations	8.0452	0.132123	1.06%
CB Rate Expectations	-16.9873	0.370068	-6.29%
Corporate Credit	25.6743	-1.06544	-27.35%
DM FX	4.4319	-0.0783183	-0.35%
Economic Growth	-3.0611	-0.131188	0.40%
Energy	-29.8352	-0.145146	4.33%
Forward Growth Expectations	7.7738	0.145044	-1.13%
Inflation	-28.4806	-0.624003	17.77%
Metals	-4.590	0.140095	-0.64%
Real Rates	-0.3935	-0.0335415	-0.01%
Risk Aversion	11.9404	-0.677825	-8.09%
10Y Yield	-11.5103	-0.0758936	0.87%
Total Impact:			-19.43%

% Impact of 50bps widening in CDX HY for S&P500 stocks



9. Combining Macro & Fundamental Insights

Equity fundamental investors often focus on the style factor exposures of their portfolios. This is where a macro lens can be useful. The performance of style factors is often driven by macro factors. A macro factor lens can therefore help equity investors understand style factor dynamics, as well as major thematic factors, in greater depth.

More comprehensive risk awareness:

Macro factors can explain transient but powerful moves; fundamental factors capture longer-run drivers.

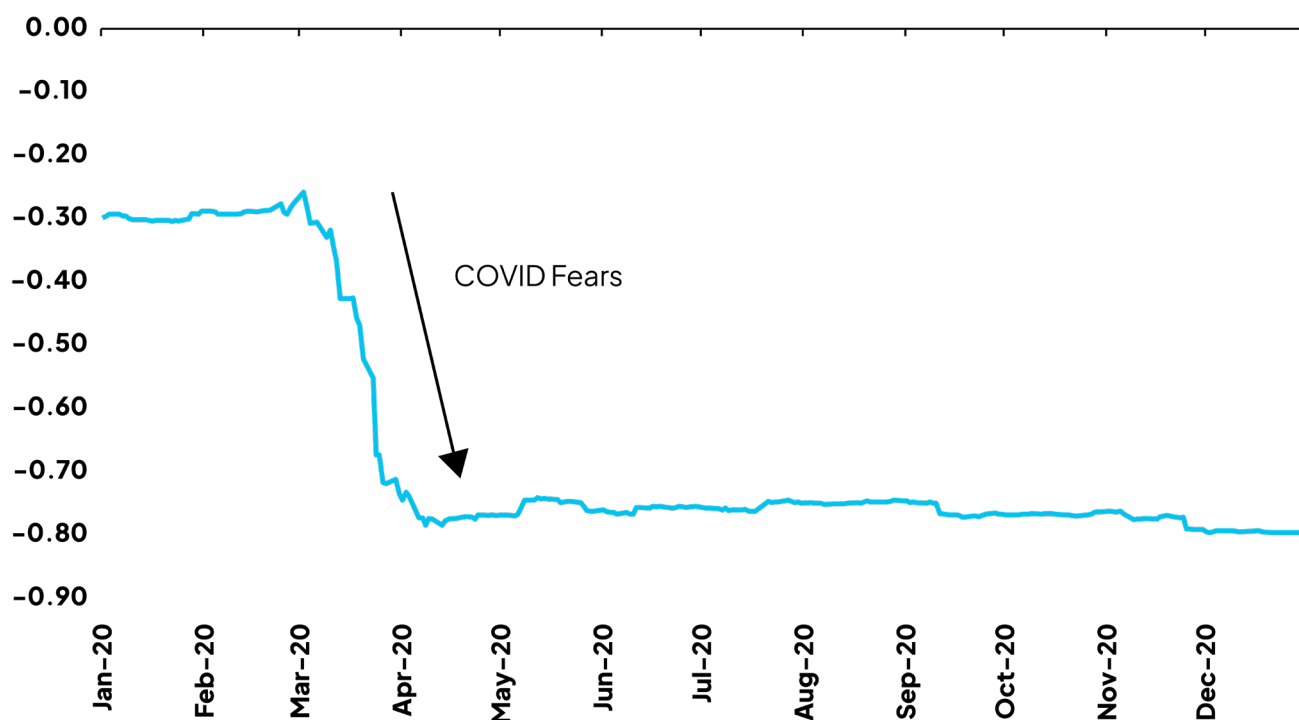
Enhanced performance attribution:

Pinpoint whether a style factor's out- or under-performance was truly "style alpha" vs. a macro tailwind/headwind.

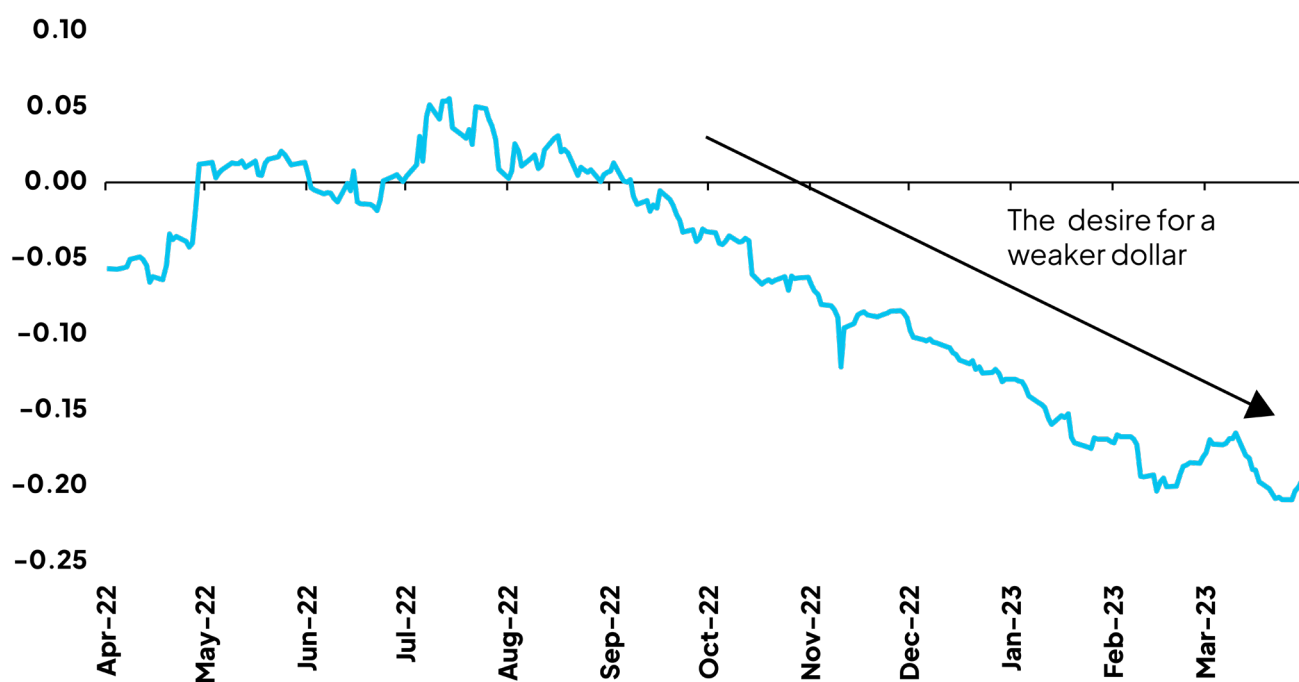
Actionable:

Helps managers manage volatility, target/hedge specific macro exposures, and better communicate risk narratives to investors. (Ref: qi-axioma-final PDF, p.1-3)

Value Factor Exposure to HY Credit (% Chg for 1std dev daily move higher in factor)



Growth Factor Exposure to DM FX (% Chg for 1std dev daily move higher in factor)



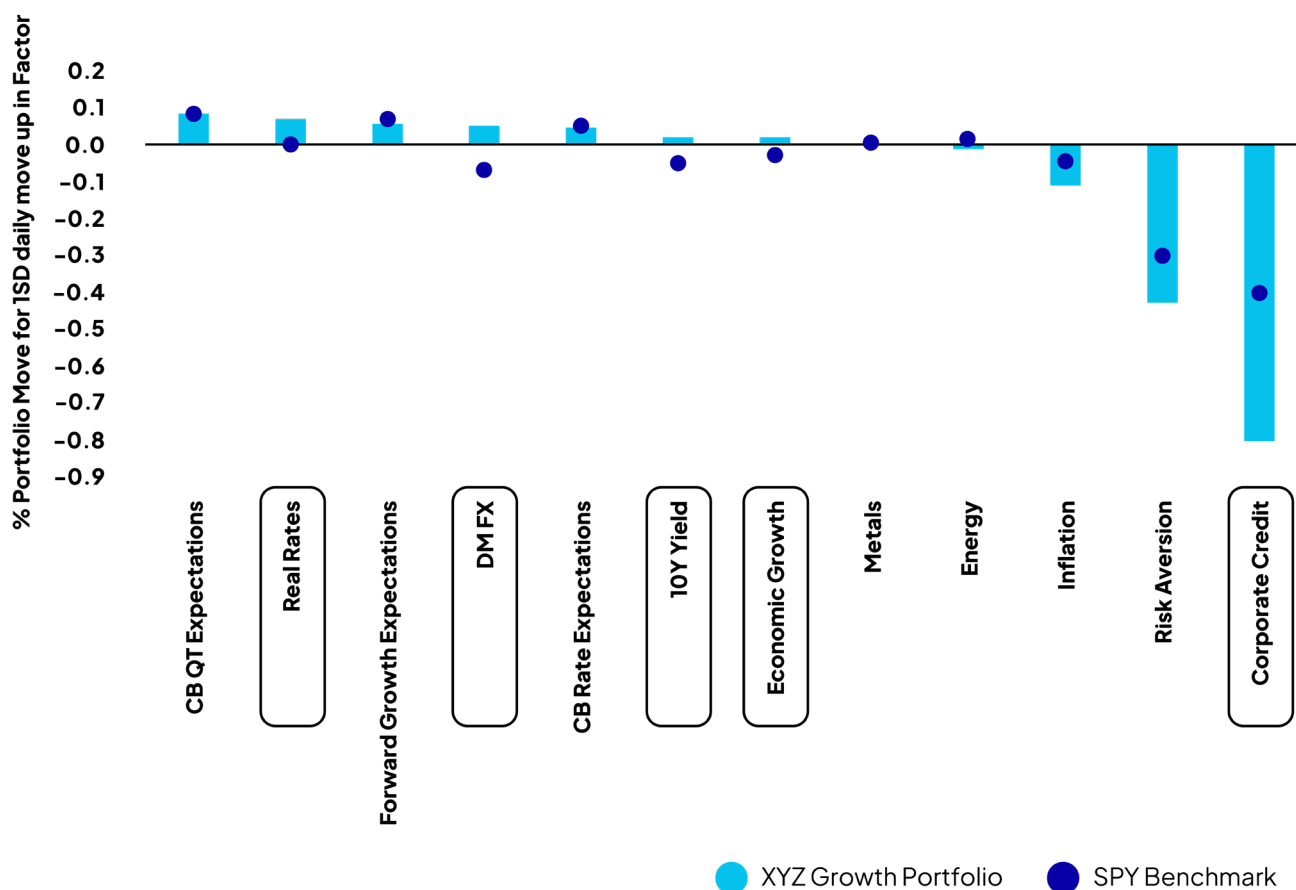
10. Use Cases for Asset Managers

We summarise some use cases for asset managers below.

1) Portfolio Construction:

Identify and dial down unintended macro bets.

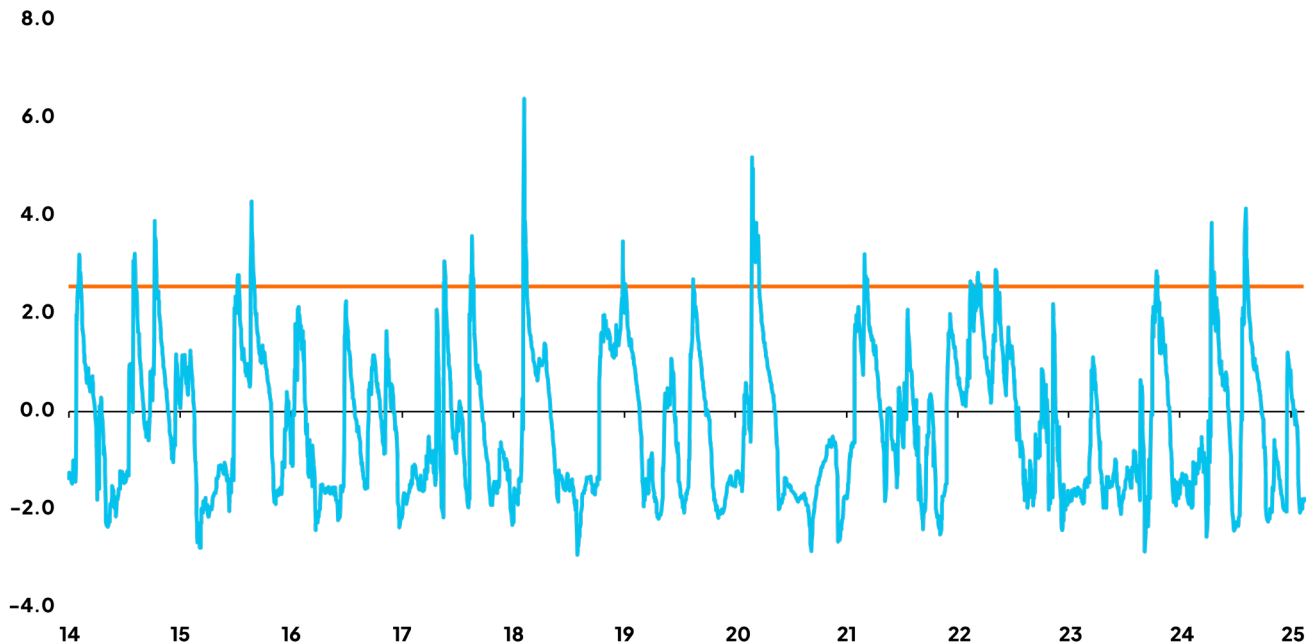
Macro Exposure Sensitivities vs. Benchmark



2) Risk Monitoring:

Track factor volatility “spikes” to adjust exposures (e.g., partial de-risking if macro factor vol jumps).

SPY Factor Vol Z-Score



Using QI Factor Vol 50D
Z-Score on SPY

	100% Long	Risk Reduce	Risk Short
Average Ann Return	13.3%	15.0%	18.3%
Annualised Vol	16.8%	15.3%	15.3%
Information Ratio	0.8	1.0	1.2
Max DD	-33.7%	-21.9%	-19.3%

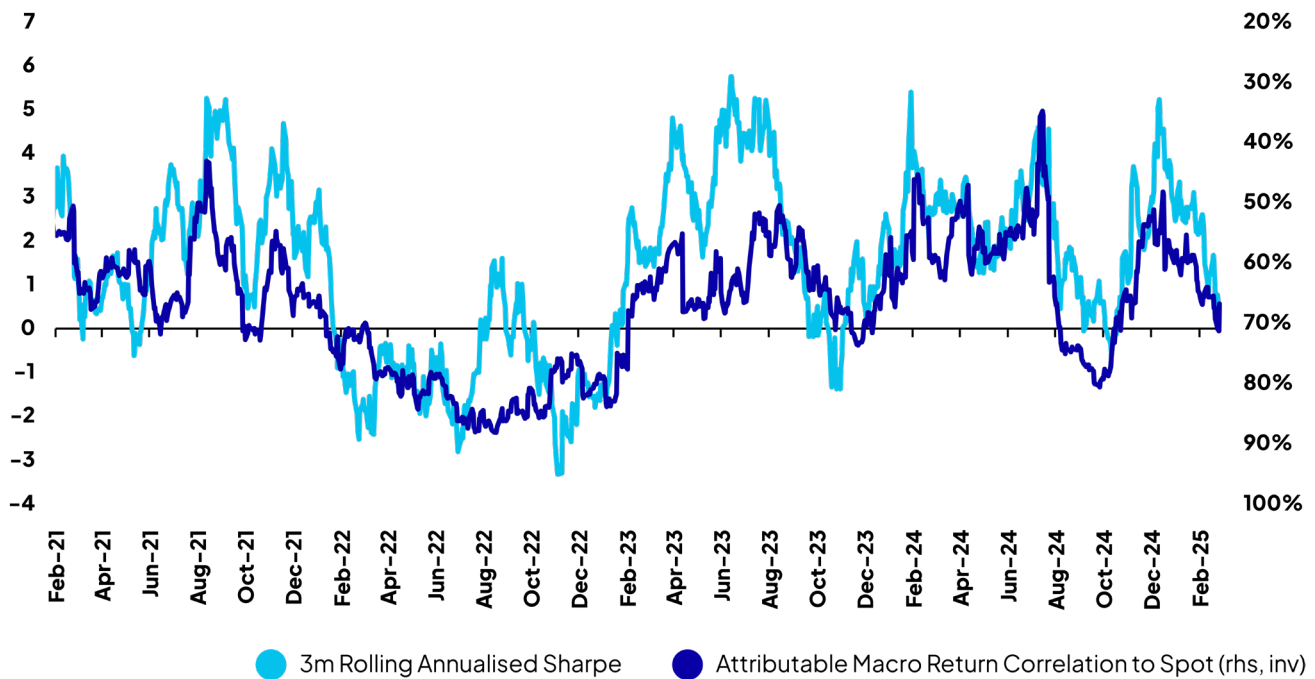
3) Manager Evaluation:

Distinguish “skill” vs. “favorable macro environment.”

4) Client Communication:

Provide clearer narratives on how macro trends affect performance.

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11. Conclusion

Macro visibility is increasingly called for:

In an environment of shifting monetary policy, geopolitical upheavals, and higher volatility, ignoring macro can leave a portfolio exposed to unseen risks.

Data & technology:

New methods (like PLSR-based models) can capture these macro sensitivities daily—something older frameworks struggled to do.

The future:

Forward-looking managers increasingly combine both macro and fundamental factor views to reveal a complete picture of risk and return drivers, stay nimble in changing regimes, and ultimately deliver more consistent alpha.

Final Note

This presentation underscores how macro factor models provide a **powerful new lens** on equity risk and returns. By complementing—rather than replacing—traditional fundamental factor models, asset managers can gain deeper, more actionable insights and confidently navigate today's macro-charged markets. We hope this was a useful guide to this new set of tools. Please feel free to reach out to us if you would like further insights on how equity funds are incorporating macro into their investment process.

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