

The MSIM Quantitative Duration Strategy Model

A Factor-Based Approach to Managing Interest Rates

BROAD MARKETS FIXED INCOME TEAM | JULY 2026

We use quantitative tools to enhance our investment process, as they help provide structure and rigour in identifying and processing relevant and important data.

Our proprietary MSIM Quantitative Duration Strategy (QDS) model advises us on tactical duration risk positioning in developed government bond markets. The model is based on five signals, which reflect factors we think are important:

1 Market Technicals

2 Risk Sentiment

3 Business Cycle

4 Carry

5 Valuation

These signals incorporate both fundamental and technical inputs based on the following criteria:

- 1. There is evidence that the relationship has worked in the past.**
- 2. Academic literature supports the idea of these inputs.**
- 3. The relationship has a plausible fundamental or behavioural explanation.**
- 4. Data is timely and readily available.**
- 5. Signals have been additive to the performance of the strategy.**

Individually, these signals have limited success in predicting bond returns vs cash (i.e., excess bond returns, which is the return one gets from taking duration risk), but when combined together they have created a more successful and reliable signal. This makes intuitive sense: by looking at a broader range of relevant data, one gets a better picture of the appropriate risk to take.

This strategy has generated attractive Sharpe ratios, resilient performances during periods of market stress and few significant drawdowns (before taking transaction costs into account). However, returns can be modest over extended periods, so the model should not be relied upon to deliver attractive results in all market conditions. QDS remains an important component of our investment process, but it is only one of several inputs we consider.

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Introduction

Bond returns are highly sensitive to interest-rate movements – i.e., duration risk – so managing that risk is critical and effective management of this risk begins with understanding it. To that end, we have developed quantitative models that supplement our qualitative assessment of markets and provide a framework for quickly processing relevant information.

Changes in interest-rate levels are typically the primary source of risk for fixed-income portfolios, especially in government bonds and investment-grade credit. As a result, forecasting movements in bond yields is a core skill for fixed-income investors – even if, as the adage goes, making predictions, especially about the future, is very difficult.

From a fundamental perspective the challenge largely reduces to correctly anticipating central-bank policy. Because the central bank directly controls short-term rates, fluctuations at the front end of the curve tend to propagate to longer maturities. For example, changes in 12-month and shorter T-bill rates have historically explained 91% of the variation in 10-year U.S. Treasury (UST) yields¹. While past relationships are no guarantee of future outcomes, knowing the likely path of policy rates should, in principle, allow for robust forecasts of yields across the curve. This explains fixed-income investors' intense focus on every nuance of central-bank communication and policy action.

But knowing that central-bank policy matters does not make the task much easier: forecasting it is formidable. It requires understanding the bank's reaction function and the ability to forecast the inputs to that function – effectively, accurate macroeconomic forecasting. Moreover, getting the policy call right is sometimes insufficient. Yields can be decomposed into **rate expectations** (the average expected path of short-term policy rates) and the **term premium** (the additional yield investors demand for holding longer-maturity bonds rather than cash). Movements in the term premium can overwhelm the path of expected short rates, complicating yield forecasts across the curve.

Fortunately, there are other ways to forecast near-term interest-rate returns. Many are little more than common-sense rules of thumb about how markets behave in specific environments, but, taken together, they form a powerful and reliable framework for managing duration

risk. Most of these rules are well documented in the academic literature; while we are not unique in using them, we do so with the confidence that they have been rigorously examined – by us and by many others. Moreover, we find that the same factors work well across all G7 government bond markets (indeed, in every market to which we have applied the analysis). This broad portability strengthens our conviction and provides a practical tool for guiding our duration positioning within and across markets.

QDS integrates a set of measurable market pricing factors that we have rigorously tested for their predictive power in forecasting future rate moves. We use the QDS signal – alongside our other quantitative and fundamental frameworks – to challenge and validate our investment thesis. The strength of these signals helps calibrate the timing and sizing of portfolio duration adjustments.

Adopting this process helps us in our goals to create alpha and achieve repeatable results in the duration management of portfolio.

MSIM Quantitative Duration Strategy (QDS) model

The model is based on five signals:

1. Market Technicals
2. Risk Sentiment
3. Business Cycle
4. Carry
5. Valuation

By considering a broader range of information, investors gain a clearer picture of the appropriate level of risk to take. Individually, these signals have limited ability to predict short-term excess returns, but when combined they generate a more robust and reliable signal. When all signals align in the same direction, it is logical to have greater conviction and undertake more risk; conversely, when the factors conflict, it is prudent to moderate active positions.

¹ Source: MSIM. Based on monthly data from January 1970 to June 2026

We find these signals work in all developed markets (DM). In addition, the relative scores between markets also provide useful positioning advice for trading cross market rates. However, while QDS has rarely gotten the markets very wrong (the model has had very few significant drawdowns), it has gone through long periods of low conviction and generating modest returns. So while QDS is an important part of our tool kit, it is not the only input in our interest rate decision-making process.

Factor-based approach

As noted earlier, the signals we use are either the same as, or closely related to, those documented in academic literature, so our approach is not necessarily novel. However, we find it reassuring that others have achieved success using similar methodologies. Our choice of inputs is guided not only by their historical effectiveness and intuitive appeal, but also by how they complement one another to create a stronger overall signal. In particular, we prioritise signals with low correlation to each other, as this increases the diversity of information within the signal.²

Signal 1: Market Technicals

QDS first signal is based on the average of two factors:

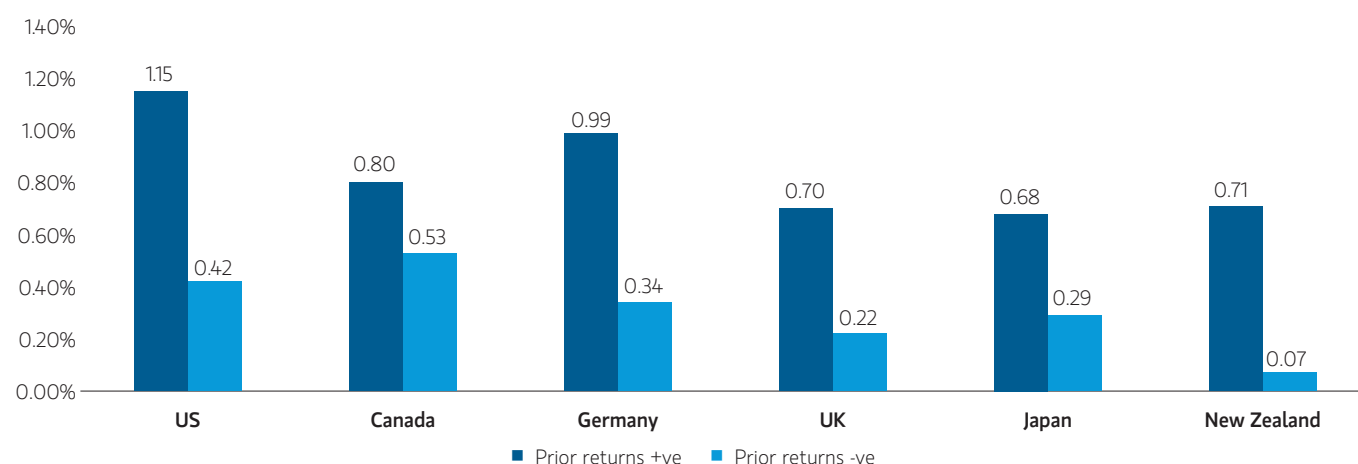
- 1. Momentum of returns** – to gauge performance trend of duration.
- 2. Reversal** – to measure tendency of rates to buck the trend.

MOMENTUM OF RETURNS

The old trader's adage is that the trend is your friend: if asset prices are going up, they are more likely to carry on doing so, and vice versa. Momentum has been observed across multiple asset classes and is a popular signal in the factor investing approach. We find it works across most developed markets. For example, since 1997, if 10-year UST excess returns³ over the previous three months were positive, then subsequent returns were on average higher (1.15% annualised). On the other hand, if previous returns were negative, subsequent returns were lower (0.42%), if still positive. This pattern repeats across other DM markets, Display 1, supporting the idea that it's more attractive to be long government bonds if prior returns have been higher rather than lower.⁴

DISPLAY 1

Excess bond returns when prior 3 months were positive or negative



Source: MSIM, Bloomberg. Period of observation is from 1997-2025. The indexes are provided for illustrative purposes only and are not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.**

² Another way to address this issue would be through altering the weights assigned to each factor, depending on the regime one is in and/or the factor's success, but we have not yet found a robust, systematic manner in which to do this.

³ Excess returns are government bond returns less the returns on T-bills. We use excess returns because it takes into account fixed income investors' opportunity cost: there is no reason to hold bonds if they are expected to return less than cash. For leveraged investors it captures the cost of funding a bond position.

⁴ There is no fundamental justification for momentum as a QDS model investment factor. However, it is so widely documented across multiple asset classes that we are inclined to use it. Explanations for it tend to be behavioural in nature due to investors under- or over-reacting to new information (e.g. DeLong, Shleifer & Waldmann (1990); Barberis, Shleifer and Vishny (1998) and Hong & Stein (1999)), or due to hedging activity (e.g. Moskowitz, Ooi & Pedersen (2012)). In our experience, many of the largest fixed income investors (e.g. banks, insurers and pension funds) can be very slow-moving, and also invest for reasons other than the short-term maximising of expected returns (meeting regulatory requirements, hedging liabilities, etc.). It therefore seems plausible to us that there can be persistent flows in fixed income markets which can generate price momentum.

REVERSAL

Our second Market Technicals factor is Reversal. Rate markets, particularly developed-market government bonds, are commonly used for portfolio hedging because they offer a liquid way to express a risk-off view when investors expect drawdowns in higher-beta holdings (e.g., equities, credit). Such portfolio hedging behaviour can cause government bonds to overshoot fundamentals. As a result, sharp moves in response to a risk shock are frequently reversed once the event has passed and pricing moves back towards fundamentals.

By explicitly capturing Reversal alongside Momentum, we build a more robust Market Technicals signal. Momentum recognizes the persistence of moves during trending regimes, while Reversal counterbalances it by identifying conditions where the probability of pullback is elevated (e.g., extreme positioning, stretched valuations, or sharp deviations from the mean). This pairing reduces the risk of chasing late-stage trends, dampens whipsaw, and improves diversification across regimes – supporting more resilient allocation and hedging decisions.

Signal 2: Risk Sentiment

Our second signal is based on the average of two factors:

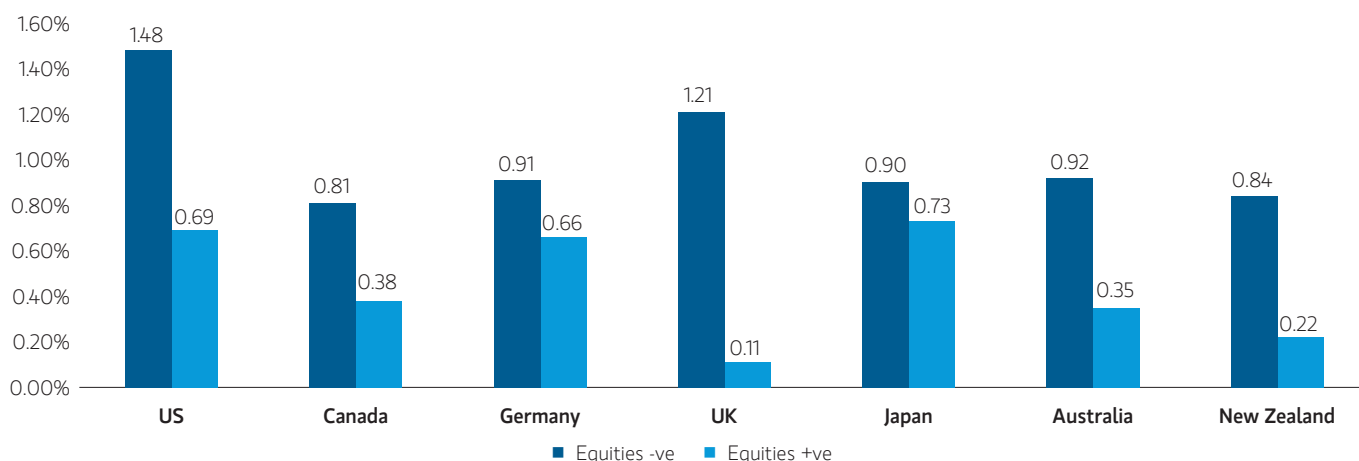
1. **Momentum of equity returns** – to gauge the performance of risky assets.
2. **The Morgan Stanley Global Risk Demand Index** – to capture broad risk-taking sentiment.

PRIOR EQUITY RETURNS

Across the major DM bond markets, we find that excess returns are higher when equity returns over the previous six months have been negative, and vice versa (Display 2). We also find the performance of emerging markets (EM) versus DM equity performance a useful indicator of future returns, i.e. bonds have done better when EM lagged behind, and vice versa. The idea that bonds should do well when equities do badly is not surprising, but what is interesting is that equity market performance tells us something useful about the potential for future bond market returns. One explanation for this is an “inverse wealth effect”: investors are more risk averse following a period of poor asset returns, which has reduced their net wealth⁵. This causes them to be more willing to buy government bonds. An alternative explanation is that there is persistence in asset price performance, which means past equity market returns are an indicator of future risk sentiment.

DISPLAY 2

Excess bond returns when prior equity returns were positive or negative (%)



Source: MSIM, Bloomberg. Period of observation is from 1997-2025. The indexes are provided for illustrative purposes only and are not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.**

⁵ This is the explanation offered by Ilmanen (1995), who first observed that equity performance could be used to forecast bond returns.

MORGAN STANLEY GLOBAL RISK DEMAND INDEX

Since 2004, Morgan Stanley has published a daily index measuring risk sentiment across markets.⁶ It combines 10 different asset classes into a single risk-taking measure, including volatility indicators of equity, bond and FX markets as well as performance of beta (EM vs G10 bonds, HY vs IG bonds, precious vs base metals, G10 equity vs bonds, growth vs value U.S. equities).

The rationale behind the Risk Sentiment signal is that risk sentiment and the performance of risky assets tend to exhibit persistence, and equity market performance often has an inverse knock-on effect on risk-free assets like government bonds. **Poor returns on risky assets reduce investor wealth, making investors more risk-averse and demanding higher allocation to rate products hence pushing risk free rates lower (and vice versa).**

Signal 3: Business Cycle

The third signal comprises of two factors:

1. Economic surprises.

2. Commodity prices.

ECONOMIC SURPRISES

While it is natural for fixed-income investors to track macroeconomic data because of its influence on monetary policy, the (generally) efficient pricing of new information suggests that the latest releases should not predict future returns, even when framed as surprises versus consensus. Yet our evidence shows that excess bond returns tend to be higher after downside surprises and lower after upside surprises.

COMMODITY PRICES

Commodity prices also carry useful information: higher commodity prices are typically negative for bond

returns, likely via their impact on inflation and the monetary policy outlook, and because commodities often lead the business cycle. As with the signal we observe from equity market returns, the fact that past commodity moves help forecast bond return potential points to inefficiencies in how the bond market incorporates cross-asset information. Empirically, prior declines in commodity prices are associated with higher subsequent bond returns across the markets we have studied, a result that is also noted in the academic literature.⁷

Signal 4: Carry

The fourth rule is carry. It is generally better to be long duration when the yield curve is steep and carry is higher than when the curve is flat and carry is lower. Government bond investors earn carry both from receiving a bond yield above the cash rate and from roll-down as their bonds move down the curve.⁸

The shape of the yield curve is meant to reflect expectations for the future path of short-term interest rates, with a steep curve signalling expected central bank tightening. In theory, one should not earn higher returns simply because the curve is steep: the gains from higher carry ought to be offset by capital losses as yields rise. In practice, however, excess returns have been higher when the curve is steeper than average, and lower when it is flatter. For USTs, average returns have been 1.54% when the curve is above-average steepness and 0.17% when it is below average. This rule of thumb holds across DM rates (see Display 3). A common explanation for the success of carry in government bonds is that the curve is partly driven by **term premium**, and term premia tend to be larger when the curve is unusually steep.⁹

⁶ Morgan Stanley, "MS Global Risk Demand Index", Strategy and Economics, May 2004.

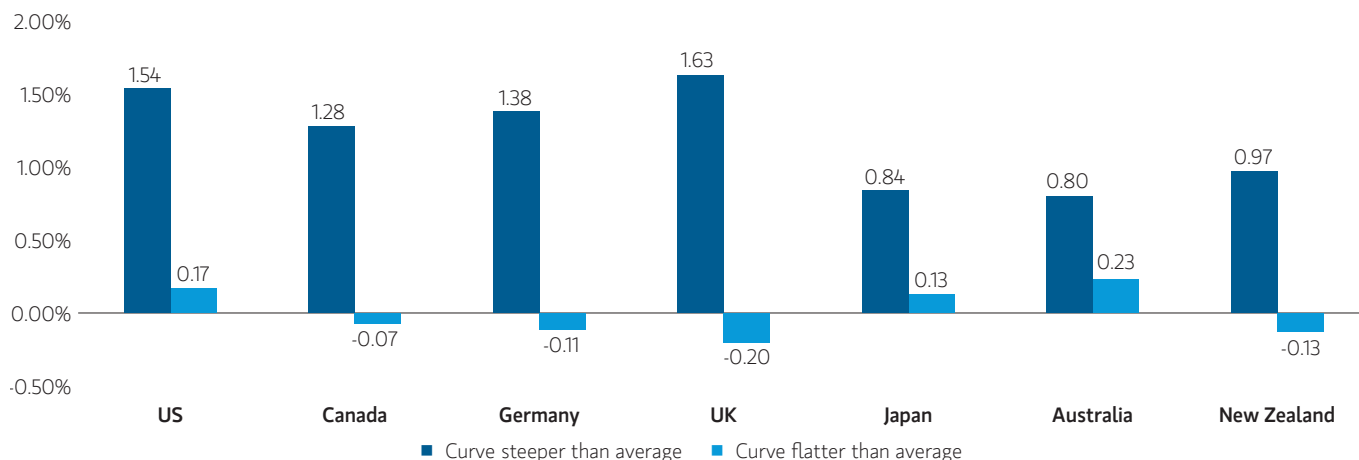
⁷ Our finding is consistent with "Quantitative Forecasting Models and Active Diversification for International Bonds" by Ilmanen & Sayood (2002).

⁸ Note that "duration carry" risk is very different in nature from "credit carry" risk (i.e. the additional yield investors are paid for taking on default risk) in two ways. First, its returns are more normally distributed, in contrast to credit risk which spikes lower when a default threatens. Second, it tends to be negatively correlated with risky asset returns, as the curve is steeper when the macroeconomic outlook is negative and the central bank has cut rates. This makes it a generally more attractive exposure to hold in a portfolio context.

⁹ If there is more term premium in the curve, it also implies that investors perceive there is more risk in being long duration. We look to address this in our QDS indicator by looking at volatility-adjusted returns, as the attraction of being long for carry partly depends on the risk associated with holding the position while one accrues the carry. This adjustment is of crucial importance when considering markets which have undergone regime shifts, e.g. the carry from owning Japanese Government Bonds (JGBs) is considerably lower than it was 20 years ago, but expected volatility has also collapsed. As a result, carry strategies can still be attractive even if the curve is a lot flatter now than it has been in the past.

DISPLAY 3

Excess bond returns when yield curve is steep or flat



Source: MSIM, Bloomberg. Period of observation is from 1997-2025. The indexes are provided for illustrative purposes only and are not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.**

Signal 5: Valuation

Our final principle is straightforward: purchase bonds when they are “cheap” and sell them when they are “rich.” Although value investing is a very intuitive and popular strategy in many markets, it has faced significant challenges in government bond markets in recent years. In particular, the use of unconventional monetary policy measures, such as Quantitative Easing, kept government bond yields at extraordinarily low levels for extended periods of time in the 2010s, which was then followed by a sharp rise in yields due to the inflation shock to the global economy following the Covid epidemic. Defining “value” in this context, in a way that helped one make successful investment decisions, has been challenging.

We therefore use a relatively simple measure of value: the current real yield on 10-year bonds relative to its 5-year average. Using real yields is intuitive, as it gives one an indication of the real return a long term investor should expect to receive. By adjusting it for its recent trading range helps adjust for the regime shifts we have seen over time, in both the economy and the central bank response function.

Constructing a Diversified Portfolio of Signals

The five signals above capture key drivers of government bond returns, which, when combined into one Quantitative Duration Strategy, leads to a reliable duration-positioning indicator, which enhances portfolio value over time.

We look to create a strategy which is balanced not only in terms of its data input but also how it performs. Some of the factors have a trending bias, e.g. Momentum suggests the more bonds sell off, the more one wants to short them; similarly for Risk Sentiment, the better the equities do, the more one should keep selling risk-free assets. On the other hand, valuation metrics (Valuation and Carry) provide a counterbalance to this, flagging when the rally or sell-off has gone too far¹⁰.

The combination of five factors helps one identify high conviction investment opportunities, when valuations are still extreme but have started to correct back towards “fair value”.

This principle applies more broadly to the heuristics discussed and to the way we combine them to construct

¹⁰ “Value and Momentum Everywhere” by Asness, Moskowitz & Pedersen (2013) explores how the negative correlation between value and momentum investing leads to very effective combined investing strategies due to the negative correlation between the two strategies, and how this approach works well in multiple asset classes.

a more robust duration positioning indicator. Considered individually, each rule has limited utility in forecasting future returns; taken together, however, they can provide a more powerful and reliable signal. This is because each rule contributes a distinct, relevant perspective, yielding a more comprehensive view of likely interest rate dynamics. In effect, we assemble a diversified portfolio of fixed income signals, enhancing the resilience and overall quality of our investment approach.

For each rule, we derive a normalised signal on a common scale from -10 (most bearish, i.e., forecasting higher yields) to +10 (most bullish, i.e., forecasting lower yields). The composite positioning signal is calculated as the arithmetic average of the individual signals. To avoid acting on low-conviction indications, we apply a neutral band around zero: if the composite score lies between -1.5 and +1.5, we set it to zero and refrain from taking a position. Throughout, we deliberately keep the indicator's construction simple and transparent to facilitate interpretability and to mitigate the risk of data-mining.

Limitations

QDS is built on well-researched inputs and readily available data, and its results have shown consistency across different market regimes. However, there are several limitations to consider:

TRANSACTION COSTS

The results presented do not account for transaction costs. Yet we believe QDS performance can be replicated in real portfolios, particularly when investors express views via synthetic markets or transact in more liquid baskets. Additionally, setting the combined signal to neutral when it falls between -1.5 and +1.5 helps minimise trading frequency, reducing costs and noise.

SIGNAL WEIGHTS

As market conditions evolve, certain factors may outperform others, raising questions about factor weights and the need for frequent rebalancing. Similarly, **QDS can experience long periods of low-conviction scores, meaning it cannot always be relied upon to provide active investment recommendations.** Since QDS is designed to inform fundamentally driven investment team rather than operate as a standalone strategy, we maintain equal weights for simplicity and transparency. This

approach facilitates discussion on whether specific signals are better suited to prevailing market conditions.

CORRELATION BETWEEN SIGNALS

Technical signal exhibits higher correlation with Risk Sentiment, which can reduce the efficacy of QDS output. On the other hand, relatively faster-moving Technical and Risk Sentiment signals show low or negative correlation to slower-moving Business Cycle, Carry and Value signals, providing a balanced mix of inputs.

Conclusion

Our proprietary MSIM Quantitative Duration Strategy (QDS) model advises us on tactical duration risk positioning in developed government bond markets over a short time horizon (one to three months). The model is based on five signals incorporating both fundamental and technical inputs. Individually, these signals have limited predictive power for short-term government bond excess returns, but when combined they create a more robust and reliable signal. QDS has generated attractive Sharpe Ratios, strong performances during periods of market stress, and few significant drawdowns (before taking transaction costs into account).

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