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Investments

Mackenzie Multi-Asset Strategies Team

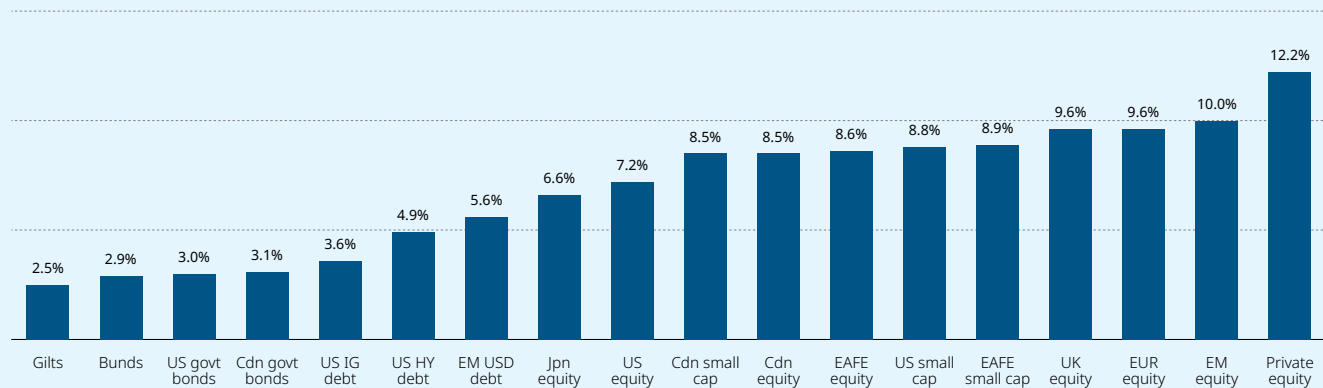
# Enhancing return and reducing risk with currency hedging



## Introduction

Long-term expected returns for most asset classes are currently low, or below their long-term historical averages. In our 2020 Orange Book, we detailed our long-term return expectations for a variety of public and private asset classes. Annual returns on government bonds are expected to hover around 2-3%, while we expect global equities to return between 6-9% per year, depending on the geography or the capitalization.

### Mackenzie Multi-Asset Strategies expected returns (geometric average) over next 5 years



Source: Mackenzie Investments, Orange Book 2020.

These below-average return expectations suggest that investors will need to consider whether their portfolios are structured to optimize risk-adjusted expected returns. Currency has often been a neglected aspect of institutional and retail investor portfolios in Canada that has the potential to reduce portfolio risk and improve expected returns.

In recent decades, the thinking around the management of the currency component of global portfolios has evolved in Canada. In the 1990s and early 2000s, many Canadian pension plans tended to hedge approximately half of their foreign equity holdings. However, more recently, there has been a trend toward reducing hedge ratios. This trend has coincided with research showing that unhedged foreign exchange (FX) exposure effectively reduces equity risk for Canadian investors. However, these results coincided with a decade (2003-2013) in which the Canadian dollar proved to be highly pro-cyclical with global equity markets. For this reason, many Canadian investors felt reassured leaving their foreign equity portfolios unhedged with the belief that this practice reduces risk as weaker foreign equity returns would be offset by a weaker Canadian dollar.

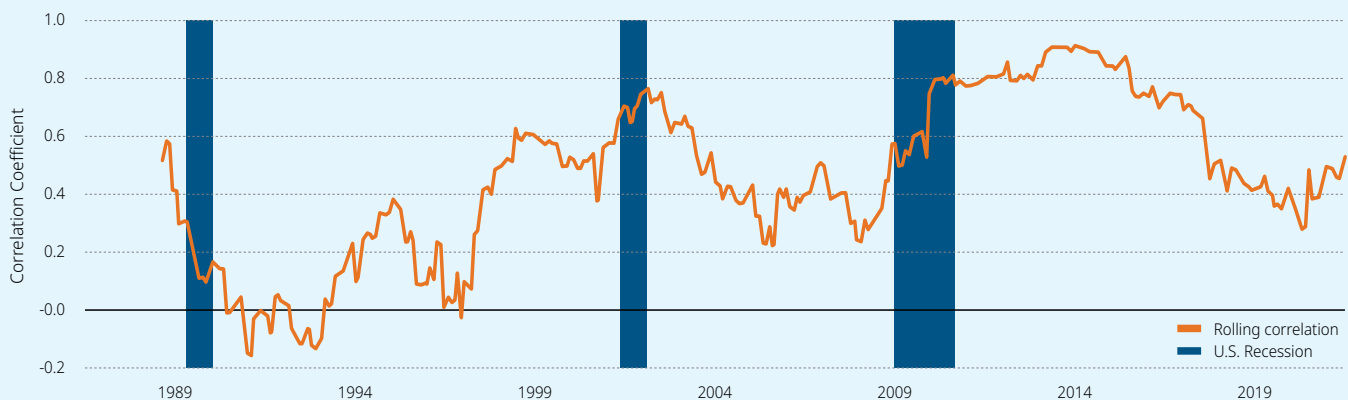
**Currency is an asset class which can be utilized to reduce portfolio risk and improve returns.**



Canadian investors are reassessing their optimal exposure to foreign currency as correlations have weakened. Indeed, the significant U.S. equity market rally of the last 10 years was not accompanied by corresponding strength in the Canadian dollar, challenging the post-2000 assumption that unhedged foreign equity exposure is risk-reducing.

### Correlations of CAD to global equities have changed through time

2y rolling correlation of monthly returns, MSCI ACWI and CAD/USD.



Source: Mackenzie Investments (data via Bloomberg)

Currency is an unavoidable component of the risk and expected return of a globally diversified portfolio. For Canadian investors, any decision about FX management—even a passive approach—implies taking a view on the risk-and-return characteristics of foreign currencies relative to the Canadian dollar. This paper considers different approaches to managing foreign currency exposure and outlines our investment philosophy.

**As correlations have changed, Canadian investors are looking at currency exposures more critically.**



## Approaches to currency hedging: risk management

### Different currency hedging approaches: From 0% to 100%

A wide variety of FX hedging approaches exists to match with investors' varying risk preferences. Authors such as Michenaud and Solnik (2008)<sup>1</sup> noted that investors often tend to experience the regret of not making the ex-post optimal currency hedging decision. As such, for those investors, the anticipation of future regret should be incorporated in the objective function when considering the ex-ante optimal hedging policy. In this context, a 50% hedge ratio can represent the simplest and most effective currency hedging policy to deal with regret, as it necessarily minimizes the regret associated with having chosen the wrong policy. The authors find that this policy is optimal in the case of one behavioural condition: extreme regret aversion. Under different degrees of regret aversion, optimal hedge ratios will vary.

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Another middle-of-the-ground approach is optimal "risk-reducing hedging". In the context of a global portfolio containing a significant equity risk component, Campbell et al. (2010)<sup>2</sup> suggest that risk-minimizing equity investors should adopt a currency hedging approach that is heavily tilted toward currencies exhibiting negative correlations to global equity markets. This would result in a portfolio that is structurally long or overweight the U.S. dollar, the Swiss franc and the euro, while being structurally short or underweight other, more pro-cyclical currencies. The authors also suggest there is little evidence that risk-minimizing investors should adjust their positions in response to varying interest rate differentials. The conclusions change somewhat when considering optimal currency hedging for risk-minimizing fixed income investors, as the authors find most currency returns to be uncorrelated to bond returns. As such, the authors believe that risk-minimizing bond investors should fully hedge their international bond positions.

At one end of the FX hedging spectrum, Black (1989)<sup>3</sup> derives a result where the optimal amount of currency hedging is the same for every investor and remains stable through time. The international capital asset pricing model implies that uncompensated volatility from foreign exchange movements should be largely hedged, resulting in a hedge ratio close to 100%.

At the other end of the spectrum, Froot (1993)<sup>4</sup> suggests a completely different approach for investors with long time horizons. The author argues that while FX hedges can minimize return variance at short horizons, this is not the case over long horizons. In this context, a low hedge ratio (close to 0%) is recommended to minimize long-run return variance.

<sup>1</sup>Michenaud, Sébastien, and Bruno Solnik. "Applying Regret Theory to Investment Choices". *Journal of International Money and Finance*. Volume 27, Issue 5 (2008), pages 677-694.

<sup>2</sup>Campbell, John Y., and Karine Serfaty-De Meideiros. "Global Currency Hedging". *The Journal of Finance*. Volume 65, Issue 1 (2010), pages 87-122.

<sup>3</sup>Black, Fischer. "Equilibrium Exchange Rate Hedging". *The Journal of Finance*. Volume 45, Issue 3 (1989), pages 899-907.

<sup>4</sup>Froot, Kenneth A. "Currency Hedging Over Long Horizons". NBER Working Paper 4355 (1993).

## Matching currency hedging approaches to specific risks

The approaches mentioned above, while considerably different in their conclusions, all have their respective merits. However, they are each designed to tackle specific risks that, in turn, are matched to investor preferences or objectives.

The first risk is simply **currency risk**, which is the risk that foreign currency exposure will represent a drag on a portfolio in absolute terms. If an investor's goal is to reduce this currency risk, a 100% hedge ratio will represent the appropriate hedging policy. By fully hedging the foreign currency exposure, investors concerned with a potential drag from foreign currencies would be able to strip out the currency impact and only experience the returns tied to the underlying foreign assets.

Second, we define **absolute risk** as the risk of a total portfolio (which includes exposure to foreign currencies) experiencing negative returns. For this case, risk-minimizing hedging, which includes structural exposure to currencies that are negatively correlated to equity markets, would be considered appropriate. Long positions in "defensive" currencies provide a partial buffer against equity market drawdowns, limiting the risk of total portfolio negative returns.

Third, there is also **relative risk**, of underperforming a benchmark. This benchmark could represent peers, a specific formula or even liabilities. In each case, the risk is one of relative underperformance. No blanket approach would be appropriate in this case, as benchmarks tend to be investor-specific. Management of this relative risk would therefore need to be idiosyncratic, based on the investor and the benchmark.

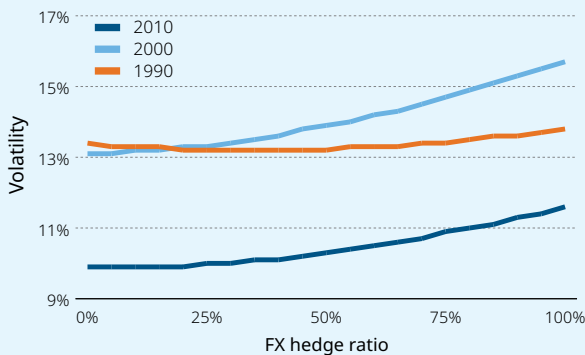
Finally, there is **liquidity risk**, or the risk of being unable to meet short-term financial demands or commitments. FX hedging can generate cash flow requirements to settle hedges, resulting in liquidity requirements that may need to be funded by liquidating other assets in the portfolio. If an investor wanted to minimize this risk, a fully unhedged policy would be most appropriate.

| Key risk  | Risk reduction strategy     |
|---|-----------------------------|
| <b>Currency Risk</b>  |                             |
| The risk of currencies having a negative impact on a portfolio    | Fully hedged                |
| <b>Absolute Risk</b>  |                             |
| The risk of the total portfolio having negative returns           | Risk minimizing hedge ratio |
| <b>Relative Risk</b>  |                             |
| The risk of a portfolio underperforming (e.g. liabilities, peers) | Portfolio specific          |
| <b>Liquidity Risk</b>   |                             |
| The risk of being unable to meet short term financial demands     | Fully unhedged <sup>1</sup> |

## The intricacies of managing “absolute risk”

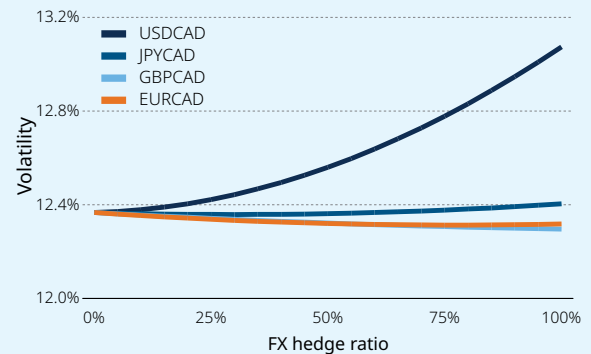
Many investors with long horizons—such as pension plans, endowments or foundations—are particularly concerned with absolute risk, or the risk of large absolute drawdowns in their portfolios. Long-term capital preservation tends to be key for these investors. As mentioned above, risk-minimizing hedging is usually appropriate in this case. However, for Canadian investors, the ideal risk-minimizing hedge ratio has changed over time, as currencies have behaved differently through various decades. Currencies experience regime change based on varying macroeconomic conditions or evolving fiscal and monetary policies. For this reason, investors cannot simply set a hedge ratio once and expect it to remain risk-minimizing over time. For Canadian investors in the MSCI World Index, the currency hedging decision grew in terms of its importance on total portfolio volatility after the 1990s, and remains a key decision today.

**Volatility of MSCI World index for Canadian investor, based on different FX hedge ratios, by decade**



Source: Mackenzie Investments

**Volatility of MSCI World Index based on different hedge ratios for Canadian investors using monthly returns data (G5 currencies)\***



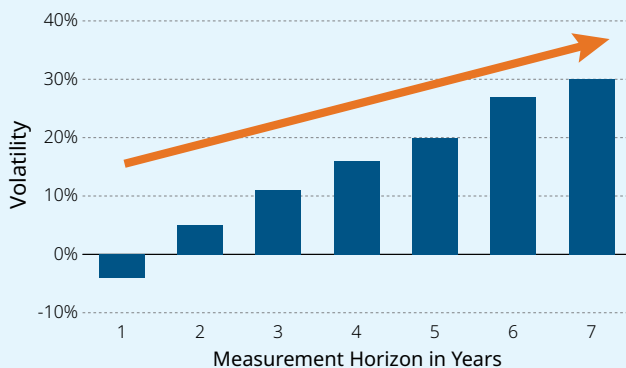
\*For the period ranging from 1990 to today

Another key element of managing absolute risk is considering the risk-reducing properties of specific currencies. These properties are driven by each currency’s specific macroeconomic characteristics, such as the balance of payments or the net international investment position. “Safe havens” typically experience positive repatriation flows in episodes of market stress, leading to appreciation. In contrast, the Canadian dollar is the pro-cyclical currency of a small, open economy that typically runs current account deficits. In this case, optimal hedge ratios for Canadian-resident investors vary based on the currencies being hedged as each foreign currency is associated with different risk characteristics to a global portfolio.



Time horizons also matter for investors looking to minimize risk. Using data ranging from 2000 to 2018, we find that for Canadian investors, the currency contribution to the volatility of a 60/40 global portfolio<sup>5</sup> increases with time horizon. This implies that for investors with longer time horizons—for example, institutional investors with long-dated liabilities—a fully unhedged exposure to foreign currencies is actually riskier. Statistically, this result reflects the fact that returns are not independent and identically distributed over a wide span of measurement horizons. Intuitively, the Canadian dollar trades with equities over short horizons so unhedged FX exposure tends to reduce total risk initially. However, exchange-rate movements are highly persistent so they tend to contribute to higher total volatility over time.

### % of portfolio risk due to currencies over various measurement horizons (Canadian investors in international equity, unhedged)



**For investors with longer time horizons, a fully unhedged exposure to foreign currencies is in fact riskier.**

Source: Mackenzie Investments

In the Canadian context, this finding challenges the insights of Froot (1993), who recommended a 0% hedge ratio to minimize total portfolio variance over long horizons. On the contrary, we see Canadian investors experiencing an increasing amount of risk from foreign exchange movements as time horizons lengthen. By distinguishing between short- and long-term horizons, this finding also complements the conventional wisdom among many Canadian investors that the inherent pro-cyclicality of the Canadian dollar provides intrinsic protection and smooths out volatility from equity risk.

Finally, and unrelated to the choice of which risk to manage, some investors will make a case for leaving foreign currency exposures completely unhedged, on the basis that all currencies eventually revert to fair value over the long run. Assuming this is true—at least in the developed world—an important corollary should follow: that currency returns can be predicted to some extent over the long run, based on reversion to estimates of fair value, such as the Purchasing Power Parity level of the exchange rate. Hence, if the investor believes in return predictability, this begs the question: why not take advantage of it to add return to a portfolio?

<sup>5</sup>The portfolio is comprised of 60% MSCI World, 20% Canadian government bonds and 20% U.S. government bonds; equity is unhedged while fixed income is fully hedged.



## Using currencies to enhance return

So far, our discussion of currency hedging has focused mainly on the risk aspect of the risk/return framework. However, return enhancement is another important aspect of active currency management. As mentioned above, our 10-year return expectations for most financial assets are currently low relative to their long-term historical averages. This suggests that “fighting for every basis point” will be important for investors going forward and that it would be unwise for investors with globally diversified portfolios to ignore potential sources of excess return from the active management of currencies in both developed markets (DM) and emerging markets (EM).

### Investment philosophy

We invest across currency markets where our insights are derived from fundamental analysis and economic modelling. Our research process is focused on identifying robust alpha models that provide consistent and additive sources of value-added over time. As suggested earlier, the first source of alpha in currencies is valuation. Our research suggests that using valuation as a tilt in active currency hedging generates alpha relative to static hedge ratios. Currency valuations are the basis for “dynamic hedging”, where we rebalance currency exposures monthly based on deviations from our estimates of fair value.

| FX component only:<br>Relative performance* | One model<br>valuation | Multiple valuation<br>models |
|---|------------------------|------------------------------|
| Excess Return                               | 0.2%                   | 0.4%                         |
| Volatility                                  | 0.8%                   | 0.9%                         |
| Information Ratio                           | 0.25                   | 0.45                         |
| Max. Drawdown                               | -1.8%                  | -2.0%                        |
| Value at Risk (95%)                         | -0.3%                  | -0.4%                        |

**Using valuation as a tilt in active currency hedging generates alpha relative to static hedge ratios.**

Source: Mackenzie Investments, January 1997 to August 2017

\*The relative FX components are calculated as the risk and return compared to static 50% hedge ratios.



## Valuation Tilts

How should “value” be determined for currencies? **Purchasing Power Parity** (PPP) is foundational to many fair value models for currencies and is perhaps the simplest way of assessing deviations from fair value. The theory of Absolute PPP relies on the “Law of One Price” whereby the same basket of goods should cost the same, regardless of which currency it is priced in. However, PPP has several drawbacks. Aside from measurement issues, it ignores trade frictions, taxes and transportation costs that prevent arbitrage in the trade of goods and services. For this reason, supplementing PPP with other valuation models diversifies and enhances the robustness of currency valuation assessments.

This is where other models incorporating the balance of payments, such as the **Fundamental Equilibrium Exchange Rate** (FEER) model, can be helpful. The FEER model involves estimating the value of currencies through the lens of internal and external macroeconomic balance. Internal balance refers to an economy being at full employment, GDP being at potential and inflation being on target. External balance refers to current account imbalances and sustainable capital flows between economies that are at their respective states of internal balance. Hence, FEER models determine the movements in real exchange rates that would be required to curb significant deviations from external balance when economies have reached internal balance. Given that it looks through the cycle and refers to equilibrium outcomes, the FEER model is more normative, mapping the required current account adjustment onto FX movements.

On the other hand, **Behavioural Equilibrium Exchange Rate** (BEER) models remove this normative component and establish a behavioural, empirical link between exchange rates and other relevant, observed macroeconomic variables. A fair value estimate based on the empirical relationships is then derived. Investors can compare current market exchange rates with BEER-derived fair values to assess undervaluation or overvaluation.

Both FEER and BEER models can be used to compare the deviation between current exchange rates and model-derived fair values. This can help to supplement simpler tools, such as PPP. Again, we believe that combining different signals helps the robustness and depth of the value assessment. It is worth noting that value signals are more useful to investors over a long horizon. A currency’s adjustment to its long-term estimates of fair value does not typically happen overnight. As such, the predictive horizon of value tilts in active currency management will be long. For this reason, we find that active currency management yields better risk-adjusted returns when combining valuation signals with other classes of factors, which will be realized over shorter horizons.

## The Macroeconomic Environment

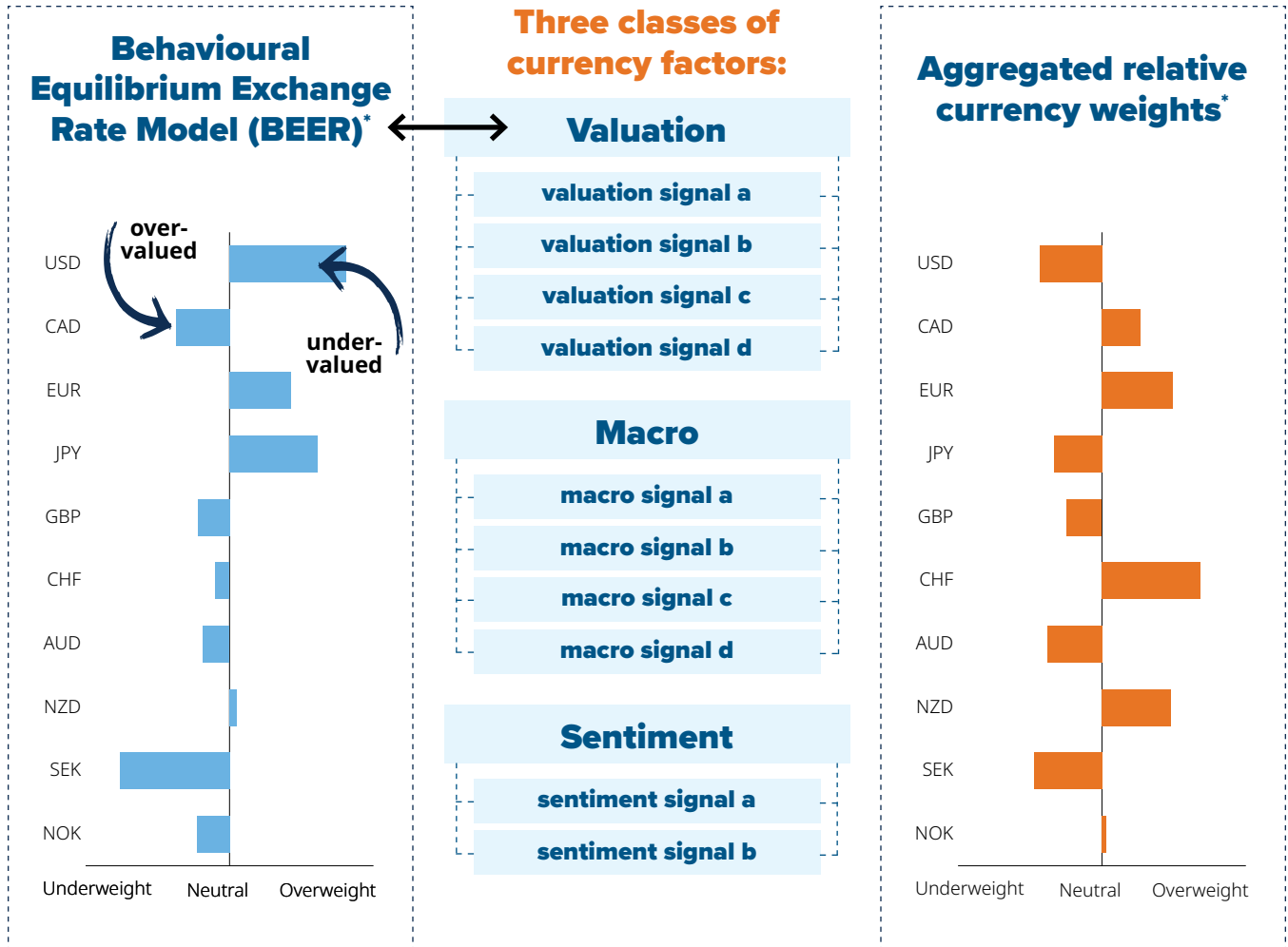
Another class of factors stems from an analysis of the macro environment. While currencies revert to their fair values in the long run, in the medium term they can deviate from these fair values as a result of changes in macroeconomic conditions. For example, stages of the business cycle, fiscal/monetary policies and interest rate differentials can all lead to predictable movements in exchange rates. As such, these conditions require an analysis of relative growth, inflationary pressures as well as relative central bank propensities to either tighten or ease monetary policy. Finally, all the above macroeconomic indicators must be assessed in relation to the expectations that are embedded in current market prices. The predictive horizon of macro factors consists of the medium term (e.g., the business cycle).

## Sentiment factors

The third broad class of factors comes from psychological analysis of investor and market behaviour, to which we refer broadly as “sentiment”. With this analysis, we aim to capture patterns of investor behaviour and detect early signs of regime change. This involves estimating measures of market trends, reaction tendencies of market participants and other behavioural patterns. The realization horizon of these sentiment measures is shorter than in the case of the valuation of macroeconomic factors. Behavioural factors tend to manifest themselves quickly in response to economic or political events, making sentiment factors a decidedly shorter-term analysis tool.

## From signals to portfolio construction

By combining the three classes of signals (valuation, the macro environment and sentiment), we derive portfolio exposures to the different currencies in the relevant universe (e.g., G10, EM or both). As mentioned above, empirical experience suggests that blending a variety of classes of signals and individual measurements within the classes enhances the robustness of our assessments and diversifies our evaluation of the relative attractiveness of currencies.



\*For illustration purposes only. Weights shown here do not represent actual positions.



| FX component only:<br>Relative performance* | Multiple valuation<br>models | Multi-factor |
|---|------------------------------|--------------|
| Excess Return                               | 0.4%                         | 0.8%         |
| Volatility                                  | 0.9%                         | 1.2%         |
| Information Ratio                           | 0.45                         | 0.66         |
| Max. Drawdown                               | -2.0%                        | -1.5%        |
| Value at Risk (95%)                         | -0.4%                        | -0.3%        |

Source: Mackenzie Investments, January 1997 to August 2017

\*The relative FX components are calculated as the risk and return compared to static 50% hedge ratios.

**Our research also suggests that this multi-factor approach to currency investing enhances risk-adjusted returns when compared to value-only tilts, leading to better efficiency and fewer, smaller drawdowns.**

## Broadening the currency universe with cross-currency hedging

For illustrative purposes, the process described above used G10 currencies as its investment universe. However, there is a way to expand the opportunity set in active currency hedging. Many portfolios have limited intrinsic exposure to smaller currencies and tend to be heavily tilted to the larger currencies (USD, EUR, JPY or GBP). Cross-currency hedging can capture opportunities that exist between other currency pairs, by deploying our multi-factor approach across a broader universe of currencies (such as EM), thereby allowing for improved breadth and, concurrently, better expected information ratios. This would allow portfolios to hedge foreign exchange exposure to other currencies that our multi-factor models deem attractive, but which may be outside of the underlying portfolio's basic investment universe.

| FX component only:<br>Relative performance* | Multi-factor | Cross-FX |
|---|--------------|----------|
| Excess Return                               | 0.8%         | 1.2%     |
| Volatility                                  | 1.2%         | 1.4%     |
| Information Ratio                           | 0.66         | 0.82     |
| Max. Drawdown                               | -1.5%        | -1.7%    |
| Value at Risk (95%)                         | -0.3%        | -0.4%    |

Source: Mackenzie Investments, January 1997 to August 2017

\*The relative FX components are calculated as the risk and return compared to static 50% hedge ratios.

**Cross-currency hedging can capture opportunities that exist between other currency pairs.**



## Using currencies as an uncorrelated return stream

Finally, another approach that goes beyond hedging would treat currencies as a liquid alternative return stream. By applying the multi-factor approach described above to a broad universe of DM and EM currencies, allowing for short selling and targeting equity-like levels of volatility (i.e., about 12%), we can potentially create a return stream close to that of equities in magnitude, but with little correlation to equity markets. This may allow investors to diversify portfolio risks away from traditional equity risk, while retaining equity-like return characteristics. This sophisticated approach considers currencies as a truly separate asset class, and not just as the consequence of investing in foreign assets.

## Conclusion

In a world where return expectations have moved lower, we believe investors should consider seeking return enhancement and risk-reduction strategies that aim to be effective at the total portfolio level. In terms of currency hedging, no single approach or hedge ratio is appropriate for every investor or consistently through time. We recommend the use of a tailored approach, based on investors' relative aversion to each one of the risks we have discussed in this paper.

We also believe innovative practices that look beyond setting a static currency hedge ratio may benefit investors via higher risk-adjusted returns. The use of multi-factor tilts and the broadening of the investment horizon via cross-hedging may be able to further reduce risk and enhance returns.

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**We recommend the use of a tailored approach, based on investors' relative aversion to each one of the risks we discussed in this paper.**

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