Insight
INVESTMENT

FX SOLUTIONS
DYNAMIC CURRENCY RISK MANAGEMENT

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EXECUTIVE SUMMARY

- Traditional approaches to hedging effectively trade currency risk for cashflow volatility, and a dynamic approach attempts to solve these problems in three ways: // 3

  1   Efficient cashflow management

  2   The potential to generate returns

  3   Increased diversification

- At the heart of our process is our currency engine: Alt-Risk Premia; quantitative in nature, fully modular, and employing a factor-based approach to currency management // 5

- Factor-based modelling aims to produce reliable and repeatable returns from currency // 6

- We outline how we build a factor-based strategy using // 7

  – Cross-sectional risk allocation: Creating a single diversified signal via allocating equal risk budgets to each factor signal

  – Time-series risk control: Automatically scaling risk up or down to meet tracking error targets

WHY CONSIDER DYNAMIC CURRENCY RISK MANAGEMENT?

TRADITIONAL APPROACHES TO HEDGING EFFECTIVELY TRADE CURRENCY RISK FOR CASHFLOW VOLATILITY

The aim of a currency hedging programme is to provide protection from adverse currency moves. However, the challenge for those wanting to hedge is that the reduction in currency risk comes with an increase in cashflow volatility, as the derivatives needed to implement the hedging programme can either generate cash inflows to a portfolio if in profit or require cash outflows if in loss.

A static hedge can, therefore, be a suboptimal solution as it will generate cash losses when the base currency depreciates and will reduce or eliminate available currency gains. Investors may be particularly badly hit when this coincides with a period of broader market stress, as negative cashflows may require the liquidation of underlying assets just at the time when valuations are at their most attractive. It is also possible that the pressure on collateral may become so extreme that those with insufficient liquidity may be unable to continue to fund their hedges, resulting in hedges being closed and positions left unhedged.

Our general sense is that international investors often underestimate the impact that currency can have on both their cashflows and the broader level of assets. This stems from a perception that currencies mean revert over the medium term and that developed market currencies have low volatility. While these perceptions aren't completely incorrect, the story is more complex when examined closely:

- The US dollar (USD) has rallied versus both the euro (EUR) and sterling (GBP) by roughly 60% peak to trough over the course of 15 years. This suggests that mean reversion cycles can be much longer and currency ranges much wider than what is commonly appreciated. In practical terms this means that if you are a US-based investor and bought EUR and GBP denominated assets and bought at the start of the dollar's uptrend, the move in currency markets would have removed 60% from the current value of your assets. Conversely, Euro and UK investors in US assets have benefited significantly over this period, provided they did not hedge.

- Currency moves within any given year can be much greater than the annual figures often quoted (see Figure 1). One very good example was the period around early November 2022 where the short-term volatility of EURUSD spiked upwards, exceeding the previous peak seen in early 2020 at the outbreak of the pandemic.

Figure 1: 12 months return USD vs. EUR[1]

Legend: USD vs. EUR 12 month spot return — +-8%
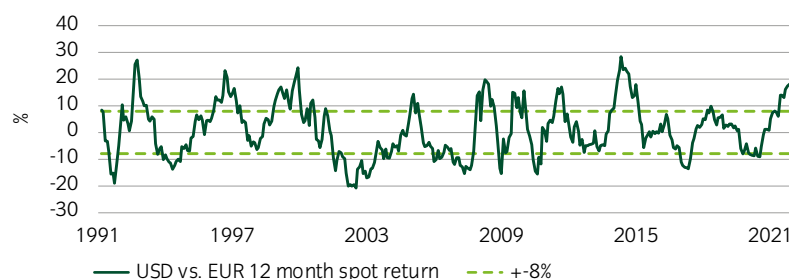
[1] Source: Insight and Bloomberg. Data between 31 December 1990 and 31 December 2022.

A DYNAMIC HEDGING APPROACH ATTEMPTS TO SOLVE THESE PROBLEMS IN THREE WAYS

1 **Efficient cashflow management:** In essence, by adjusting the hedge ratio up and down depending on expected future currency moves, the strategy aims to minimise losses, and the negative cashflows that stem from them. Dynamic solutions also allow greater controls to be built into a strategy. For example, formal limits can be set on negative cashflows over a given period, providing certainty that collateral calls don't exceed a predetermined level, relieving pressure on collateral pools.

2 **The potential to generate returns:** At its core, a dynamic hedge seeks to exploit the wide ranges currencies often move in, capturing periods when the base currency is strengthening while limiting the negative impact of base currency weakness relative to a fully hedged portfolio. While a static hedging program is fully symmetric – the positive cashflows stemming from base currency appreciation are equal to the negative cashflows for an equivalent depreciation of the base currency – dynamic hedging aims to generate asymmetry in currency returns leading to a positive cashflow stream over longer time horizons.

3 **Increased diversification:** We have analysed the most significant equity market drawdowns in the past 30 years and compared the performance of a portfolio with zero hedging and one with a 100% static hedge against a dynamic alternative. As can be observed in Table 1, when equity markets fall a dynamic hedging strategy outperforms both an unhedged and fully static hedged alternative. In our view this demonstrates that dynamic currency hedging offers diversification benefits when they are most needed, at tail events. This presents a potentially powerful tool to add to the portfolio construction process.

Table 1: Performance through historical crisis[2]

Peak	Trough	Crisis	Performance peak-trough				Value add	
			MSCI World local return	Dynamic hedging portfolio	Unhedged portfolio	100% passively hedged portfolio	vs. unhedged	vs. hedged
31/01/1994	28/02/1995	Bond crisis	-7.68%	-6.92%	-12.64%	1.53%	5.72%	-8.44%
31/07/1997	31/10/1997	Tech sell-off	-7.80%	-5.38%	-7.06%	-0.33%	1.68%	-5.05%
31/07/1998	30/09/1998	LTCM collapse	-13.93%	-3.55%	-4.85%	-0.28%	1.29%	-3.27%
31/08/2000	31/03/2003	Dot com bust	-45.83%	-1.94%	-24.76%	2.29%	22.82%	-4.24%
31/10/2007	27/02/2009	GFC	-50.77%	12.95%	7.15%	0.82%	5.80%	12.13%
29/05/2015	29/02/2016	China/Commodity slowdown	-11.39%	-0.37%	0.43%	-0.46%	-0.80%	0.09%
28/09/2018	31/12/2018	China/Trade wars	-13.14%	1.80%	1.63%	-0.61%	0.16%	2.40%
31/12/2019	31/03/2020	Covid-19	-20.10%	0.37%	1.35%	-0.43%	-0.98%	0.80%
31/12/2021	30/09/2020	Post Covid inflation	-21.86%	18.38%	13.76%	-0.99%	4.62%	19.37%
		Total		15.34%	-24.99%	1.54%	**40.32%**	**13.80%**

Considering the whole back-tested period, which starts in 1993, we can see that the total benefit of a dynamic hedge would have been most beneficial to a euro based investor with a passive 100% static hedge. The USD dollar rally that begun in 2014 provided ample opportunity for a dynamic hedge to reduce hedges away from a 100% benchmark hedge ratio.

Figure 2: A back-tested dynamic approach has significantly outperformed both an unhedged and fully static hedged portfolio[3]

— Vaue add vs. unhedged   — Value add vs. hedged
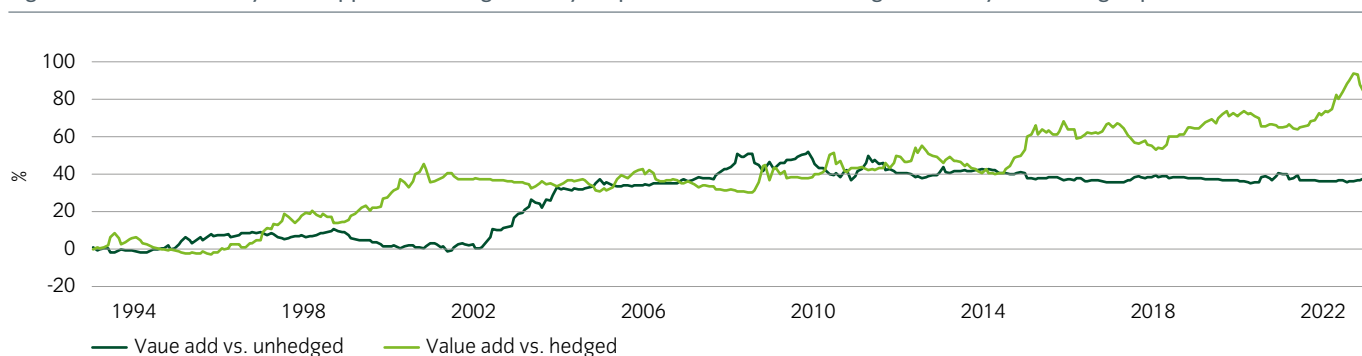
[2] Source: Insight and Bloomberg. Base currency of portfolios is euros. Model results have certain inherent limitations. Unlike an actual performance record, model results do not represent actual trading/returns and may not reflect the impact that material economic/market factors might have. Clients' actual results may be materially different than the model results presented. [3] Source: Insight. Shows cumulative return of dynamic hedging of MSCI World ex euro into euros versus unhedged and 100% static hedged returns. Insight and Bloomberg. Data between 31 December 1992 and 31 December 2022. Model results have certain inherent limitations. Unlike an actual performance record, model results do not represent actual trading/returns and may not reflect the impact that material economic/market factors might have. Clients' actual results may be materially different than the model results presented.

ALT-RISK PREMIA THE CURRENCY ENGINE AT THE HEART OF OUR PROCESS

Our approach to delivering a bespoke dynamic hedging solution is quantitative in nature, fully modular, and employs a factor-based approach to currency management, using five risk factors that we believe explain the majority of currency moves.

Each factor in turn is comprised of different signals that allow us to identify which currency pairs are likely to benefit from a given market environment. Our Alt Risk Premia (Alt-FX) solution incorporates all our risk factors and factor signals into a product that aims to generate returns over a full economic cycle. The strategy's investment signal combines individual signals that attempt to capture the main drivers of currency returns: momentum, volatility, valuation, carry and quality. The return characteristics of each of these individual signals would be expected to vary depending on market conditions (see Figure 3).

Figure 3: Correlation to S&P 500 Index versus information ratio[4]
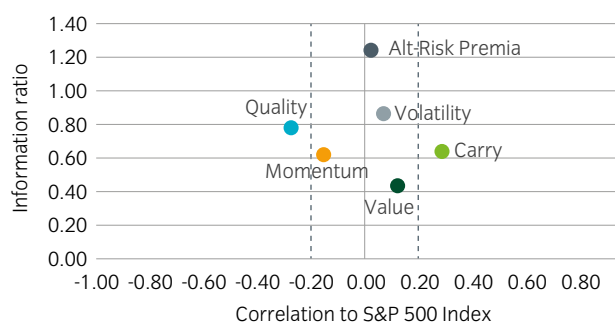
- **Momentum:** the momentum factor establishes active positioning for each currency based on the historical changes in exchange rates and risk-adjusted yield differentials. It measures the strength of both price and yield differential momentum over various time horizons as well as the quality of that momentum. This ensures that the overall signal is responsive not only to recent exchange rate direction but also takes into consideration the dynamic nature of the exchange rate move in that direction. For any given move in the exchange rate, the position is adjusted exponentially rather than linearly and is also adjusted based on our estimate of risk. These adjustments improve the efficiency of the momentum process so that the likelihood of deploying large positions in volatile and choppy environments is lowered.

- **Volatility:** the volatility factor establishes positioning for each currency based on an expectation for short-term reversions in an exchange rate. This signal takes short-term positions that are generally in the opposite direction to the momentum signal, increasing its aggression when momentum is expected to perform poorly. In this way, this signal attempts to monetise the short-term volatility in exchange rates and operates at a much shorter horizon than the momentum signal. Positioning is also positively related to our estimate of risk so that larger positions are taken when markets are choppy and the process that monetises volatility becomes more profitable.

- **Value:** the valuation factor establishes active positioning for each currency based on the currency's deviation from estimates of both short-term and long-term fair value. A long-term fair-value exchange rate for each currency is derived from a set of equilibrium estimates for real exchange rates. The model used to estimate this takes macroeconomic variables as inputs which cover GDP and international trade . A short-term fair value exchange rate for each currency estimates short-term equilibrium from a broad array of market variables: equities, implied volatility, commodities etc.

- **Carry:** the carry factor establishes active positioning for each currency based on the risk-adjusted interest rate differential. Positioning is based on the sign and size of the interest rate differential as well as our estimate of exchange rate risk. It is positively related to size of the currency forward yield differential and inversely related to our estimate of risk. This approach can be helpful in avoiding sharp drawdowns in high interest rate currencies that tend to occur from time to time.

- **Quality:** the quality factor has a two-pronged approach to discern higher "quality" properties amongst a set of currencies. It is designed to capture the relative outperformance of major (more liquid) currencies versus minor (less liquid) ones during periods of directional moves. At the same time during spells of risk aversion it will favour long exposure to the US dollar which is the ultimate benefactor of such flows.

We look to exploit our risk factors in as broad a way as possible therefore factors may contain multiple signals.

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[4] Source: Insight and Bloomberg. Data between 31 December 1991 and 31 December 2022. Model results have certain inherent limitations. Unlike an actual performance record, model results do not represent actual trading/returns and may not reflect the impact that material economic/market factors might have. Clients' actual results may be materially different than the model results presented.

FACTOR-BASED MODELLING

OUR OBJECTIVE FOR OUR CURRENCY ENGINE IS RELIABLE AND REPEATABLE RETURN FROM CURRENCY

The factors we use are based on theoretically and empirically well supported factor risk premia found in currency markets. However, there are generally several different ways to exploit each factor utilising systematic investment signals. This allows us to diversify our holdings to include several representations of a factor, increasing the likelihood that we will capture stable premia from that factor. By including several representations of each factor, we also minimise our model risk (the risk that a single representation of the factor ends up being a poor choice).

Examples:
- The value factor could be exploited using signals capturing reversion to fair value at both the long-term, based on macro variables, and the short term, based on market variables.
- The momentum factor could be exploited reactively through analysis of recent exchange rate trends or proactively by analysis of recent changes in forward exchange rate yield differentials.
- The carry factor can be exploited by averaging over a range of yields, all of which satisfy the economic rationale of carry, with the aim of increasing the likelihood that the underlying economic risk factor will be realised and making the strategy more robust.

While risk factors individually may deliver good information ratios, this is not a necessary condition for their inclusion in a factor-based strategy. The true power of factor investing comes at the portfolio level, where low correlation between alternative factors can significantly reduce portfolio volatility and tail risk. Insight's factors are designed to be diverse by construction (i.e., as a direct product of their trading rules). This means we value minimising uncertainty about the strategy above minimising statistical measures of volatility.

Examples:
- The momentum factor and volatility factor are contrary by nature. The worst environment for momentum strategies is a range bound / reverting environment where an investor may end up buying high and selling low as they try to position for momentum. For volatility strategies, the worst environment is one where markets are steadily trending.
- The carry factor and value factor are contrary by nature. Exchange rates tend to move in the direction of the carry and pick up momentum until they are significantly over/under valued at which point they revert to fair value.

When we examine the correlations between factors (see Table 2), we have found they are more reliable over time than traditional asset correlations because these risk factors are structurally diverse by construction. As such they provide an ideal platform upon which we can build a tailored strategy by overlaying cross-sectional and time-series based risk methodologies described below.

Table 2: Factor correlations[5]

|	Carry	Value	Momentum	Volatility	Quality
Carry	-	0.06	0.25	-0.05	-0.18
Value	0.06	-	-0.40	0.06	-0.21
Momentum	0.25	-0.40	-	-0.17	0.14
Volatility	-0.05	0.06	-0.17	-	-0.17
Quality	-0.18	-0.21	0.14	-0.17	-

[5] Source: Insight and Bloomberg. Data between 31 December 1995 and 31 December 2022. Model results have certain inherent limitations. Unlike an actual performance record, model results do not represent actual trading/returns and may not reflect the impact that material economic/market factors might have. Clients' actual results may be materially different than the model results presented.

BUILDING A FACTOR-BASED STRATEGY

CROSS-SECTIONAL RISK ALLOCATION

Our risk-parity framework, illustrated in Figure 4, allocates equal risk budgets (based on measures of volatility) to each factor signal. This process is repeated for each factor, combining them to create a single diversified signal. By including several similar representations of any factor, we can increase the reliability and robustness of the combined signal, with the aim of creating reliable, repeatable exposure to currency risk premia.

Figure 4: Risk-parity framework[6]
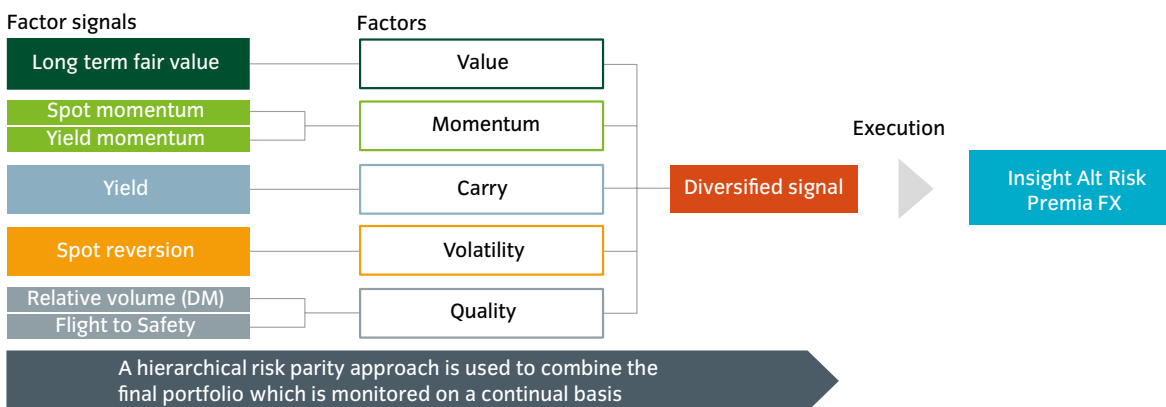
Although the allocation of an equal risk weighting may appear simple, our research, and conclusions from available literature would suggest that it is difficult to beat, especially with respect to risk allocations to systematic strategies.

Our cross-sectional risk allocation method aims to build a portfolio of currency exposures which are robustly diversified at any given point in time. This is because risk-factors are designed to be structurally diverse (e.g., momentum is the opposite of volatility) and we are allocating risk in a robust way (risk parity) across these factors, over a broad range of currency pairs.

TIME-SERIES RISK CONTROL

In addition to diversification through cross-sectional risk allocation, we use time series risk controls to scale exposures to the diversified portfolio of risk-parity weighted factors upwards or downwards in order to manage aggregate risk. This is effectively inverse volatility scaling or a tracking error target.

We believe this is the most efficient time-series risk scaling method for a systematic risk premia strategy.

An example of the effect of this time series risk control is shown in Figure 5 below. The combined signal is passed into the time series risk control, and this provides the current level of risk associated with those exposures relative to the level of risk being targeted. For example, in Figure 5, the tracking error target is 5%, and the chart area show how exposures are scaled upwards and downwards over time to ensure that the portfolio achieves the target level of risk. When we compare the portfolio with no time series risk control (in green), the contrast with the portfolio with time series risk control (in blue) is stark.

Perhaps the best illustration of this was the financial crisis of late 2008. As market volatility rose to extreme levels, this mechanism was automatically reducing exposures and limiting losses.

Figure 5: Time-series risk control scales combined signal exposures to maintain constant risk allocation (USD target TE of 5%)[7]

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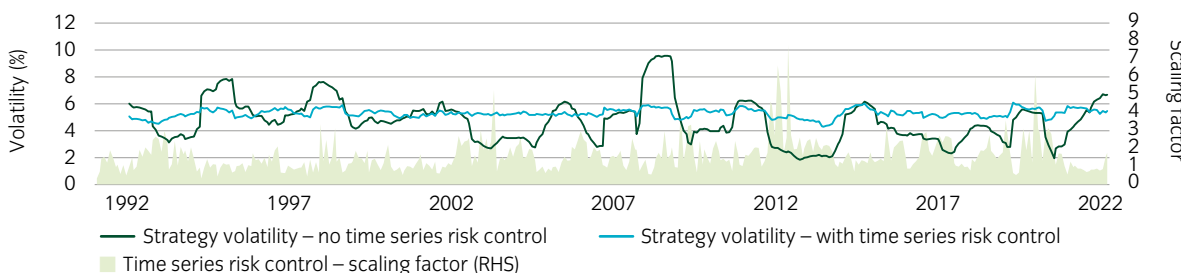
[6] Source: Insight, for illustrative purposes only. [7] Source: Insight and Bloomberg. Data between 31 December 1995 and 31 December 2022. Model results have certain inherent limitations. Unlike an actual performance record, model results do not represent actual trading/returns and may not reflect the impact that material economic/market factors might have. Clients' actual results may be materially different than the model results presented.

IMPORTANT INFORMATION

RISK DISCLOSURES

Past performance is not indicative of future results. Investment in any strategy involves a risk of loss which may partly be due to exchange rate fluctuations.

The performance results shown, whether net or gross of investment management fees, reflect the reinvestment of dividends and/or income and other earnings. Any gross of fees performance does not include fees, taxes and charges and these can have a material detrimental effect on the performance of an investment. Taxes and certain charges, such as currency conversion charges may depend on the individual situation of each investor and are subject to change in future.

Any target performance aims are not a guarantee, may not be achieved and a capital loss may occur. The scenarios presented are an estimate of future performance based on evidence from the past on how the value of this investment varies over time, and/or prevailing market conditions and are not an exact indicator. They are speculative in nature and are only an estimate. What you will get will vary depending on how the market performs and how long you keep the investment/product. Strategies which have a higher performance aim generally take more risk to achieve this and so have a greater potential for the returns to be significantly different than expected.

Any projections or forecasts contained herein are based upon certain assumptions considered reasonable. Projections are speculative in nature and some or all of the assumptions underlying the projections may not materialize or vary significantly from the actual results. Accordingly, the projections are only an estimate.

Portfolio holdings are subject to change, for information only and are not investment recommendations.

ASSOCIATED INVESTMENT RISKS

Currency risk management

Currency hedging techniques aim to eliminate the effects of changes in the exchange rate between the currency of the underlying investments and the base currency (i.e. the reporting currency) of the portfolio. These techniques may not eliminate all the currency risk.

Derivatives may be used to generate returns as well as to reduce costs and/or the overall risk of the portfolio. Using derivatives can involve a higher level of risk. A small movement in the price of an underlying investment may result in a disproportionately large movement in the price of the derivative investment.

Investments in emerging markets can be less liquid and riskier than more developed markets and difficulties in accounting, dealing, settlement and custody may arise.

Where leverage is used through the use of swaps and other derivative instruments, this can increase the overall volatility. Any event that adversely affects the value of an investment would be magnified if leverage is employed by the portfolio and losses would be greater than if leverage were not employed.

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