Mesirow

Currency for Institutional Investors

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The currency market is the largest and most liquid in the world with approximately $6.6 trillion traded a day, up from $5.1 trillion in 2016.[1] What makes the FX markets unusual and unlike other markets are the high proportion of participants such as central banks and companies that trade currency because of necessity, as opposed to speculators, purely motivated by returns. This phenomenon can create market inefficiencies and opportunities to generate returns.

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Currency as a risk provider

When investing internationally, the returns of the portfolio are not only subject to movements in the underlying asset, like equities or bonds, but also to fluctuations in the currency. A commonly held view is that currency is a 'zero sum game' and that any gains or losses caused by movements in the exchange rate will eventually 'wash out' over time. Therefore, many investors incorrectly conclude that currency can be left unhedged.

Implicit in this supposition is that developed market currencies mean revert over time, i.e. that purchasing power parity (PPP) holds. While Perold and Schulman (1988) found evidence that currencies do mean revert over the longer term, studies by Jorion (1994) and Vassalou (2000) found that returns created from unhedged currency exposure can vary significantly from zero over shorter-term horizons.

In Figures 1 and 2, we break down the returns of a typical US-based investor's international equity and bond portfolios into the underlying asset in local terms and the unhedged currency over one-year periods from 2000 to 2020. Over shorter time periods, the returns generated by leaving the currency exposure unhedged can vary quite significantly from zero.

For instance, in the case of equities, the returns created by the unhedged currency exposure ranged from -11% to 15% and in the case of bonds, these returns ranged from -12% to 15%. This coincides with the findings of Jorion and Vasslou and quite clearly shows that currency can matter over the shorter term.

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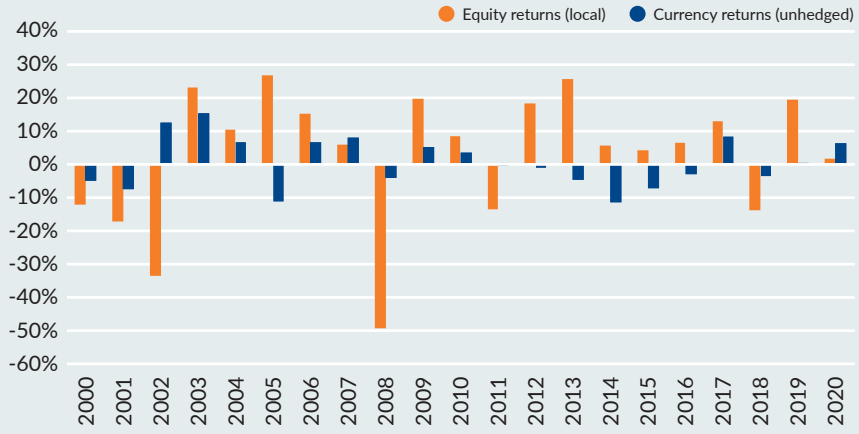
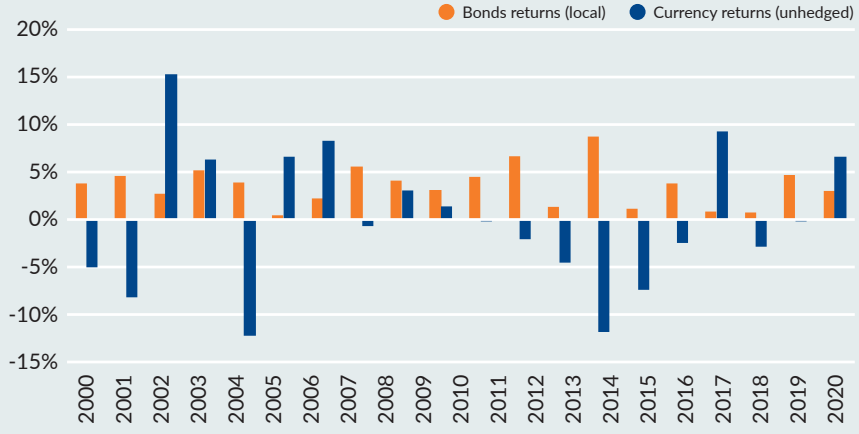
FIGURE 1: INTERNATIONAL EQUITIES: LOCAL RETURNS AND UNHEDGED CURRENCY RETURNS



Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for International equities is the MSCI World-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

FIGURE 2: INTERNATIONAL BONDS: LOCAL RETURNS AND UNHEDGED CURRENCY RETURNS



Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for international bonds is the Barclays Global Aggregate-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

When an institutional investor or plan sponsor decides to ignore currency and leave it unhedged, it is often due to one of two reasons: the impact of currency washes out over time or the currency exposure offers a diversification benefit, i.e. the returns of the underlying assets are negatively correlated with those of the unhedged currency.

Figures 1 and 2 illustrate that the former is false, certainly over the shorter term. To show that the latter is not necessarily true, in figures 3 and 4 we plot the rolling 12-month correlations between currency and equity, and between currency and bonds. For both equities and bonds, the correlation varies from negative to positive over the 20-year period. Therefore, leaving currency unhedged based on the assumption of gaining a diversification benefit may not be sensible.

Returns generated by leaving the currency exposure unhedged can vary quite significantly from zero.

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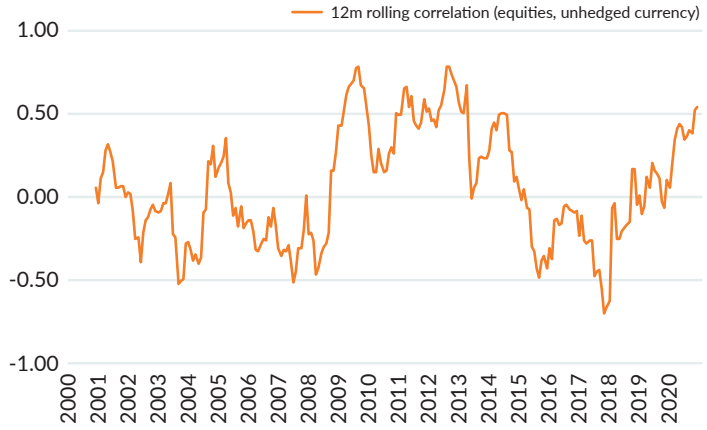
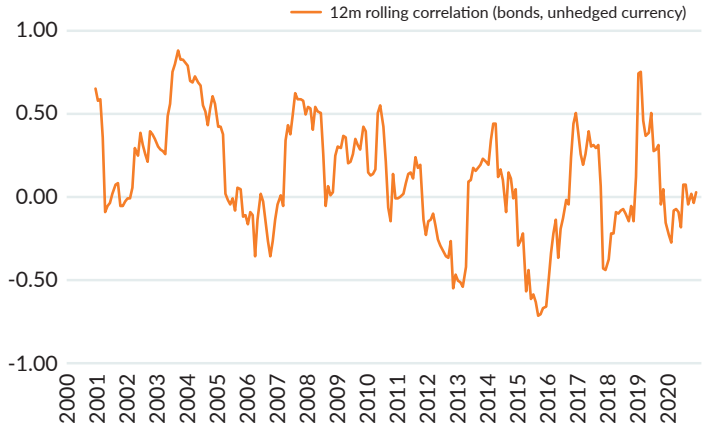
FIGURE 3: INTERNATIONAL EQUITIES: 12M ROLLING CORRELATION LOCAL RETURNS AND UNHEDGED CURRENCY RETURNS



Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for International equities is the MSCI World-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

FIGURE 4: INTERNATIONAL BONDS: 12M ROLLING CORRELATION LOCAL RETURNS AND UNHEDGED CURRENCY RETURNS



Source: Mesirow & Bloomberg. Data from January 2000 to end of December 2020. Proxy for international bonds is the Barclays Global Aggregate-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

We have seen how leaving currency unhedged in an international equity or bond portfolio can significantly add or detract from performance in any one year. But how much risk does it add to the portfolio?

Figure 5 displays the performance statistics for the equity portfolio we discussed previously, broken down by equities (in local terms), currency (unhedged) and the combination of the two (i.e., the unhedged equity portfolio). Figure 6 demonstrates the same statistics for the bond portfolio.

To calculate the amount of risk the unhedged currency contributed to the equity and bond portfolios, we use the concept of risk budgeting (Pearson 2002). Using this technique, each portfolio consists of three risk factors: the variance of the underlying asset, the variance of the currency and the covariance between the two.

This approach allows us to analyze the currency contribution of the total risk of the portfolio. With respect to the equity portfolio, currency contributed 22% of the total portfolio risk of 17.56%; with respect to the bond portfolio, currency contributed 87% of the total portfolio risk of 8%.

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The data suggests that leaving currency unhedged tends to contribute less risk in an equity portfolio than within a bond portfolio. These results concur with those of Acar and Middleton (2002) who found that currency contributed on average 80% of the total portfolio risk in an international bond portfolio and 25% in an international equity portfolio, regardless of base currency.

But why is this the case? The relative volatilities of equities and bonds versus currency explains this occurence. Over the longer term, equity returns tend to be more volatile than currency returns, while bond returns tend to be less volatile than currency returns. Hence, currency will tend to contribute less risk in an equity portfolio than within a bond portfolio.

Based on this, one may conclude that if currency 'matters less' in an equity portfolio then it can be ignored and left unhedged. However, the findings above apply to long term periods of 20 years or more. Over shorter time horizons, 3 to 5 years, it is possible to experience cases where currency returns are more volatile than equity returns, which results in currency contributing a far higher percentage of the total portfolio risk.

FIGURE 5: PERFORMANCE OF A HYPOTHETICAL USD-BASED UNHEDGED EQUITY PORTFOLIO

	Equities (MSCI - ex USD)	Unhedged	Equity + Currency Unhedged
Annualized Return	3.28%	0.57%	3.85%
Annualized Risk	14.95%	7.23%	17.56%
Return/Risk	0.22	0.08	0.22
Max Drawdown	-51.90%	-29.05%	-55.70%
Max Month	11.49%	6.64%	13.48%
Min Month	-16.55%	-5.91%	-22.46%
Risk Contributed by Currency	–	–	22%

Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for International equities is the MSCI World-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

FIGURE 6: PERFORMANCE OF A HYPOTHETICAL USD-BASED UNHEDGED BOND PORTFOLIO

	Bonds (Barclay Global Agg. - ex USD)	Unhedged	Bonds + Currency Unhedged
Annualized Return	3.79%	0.45%	4.24%
Annualized Risk	2.60%	7.33%	8.00%
Return/Risk	1.46	0.06	0.53
Max Drawdown	-3.65%	-29.42%	-15.11%
Max Month	2.23%	6.25%	7.93%
Min Month	-2.42%	-5.48%	-6.75%
Risk Contributed by Currency	–	–	87%

Source: Mesirow & Bloomberg. Data from January 2000 to September 2020. Proxy for international bonds is the Barclays Global Aggregate-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

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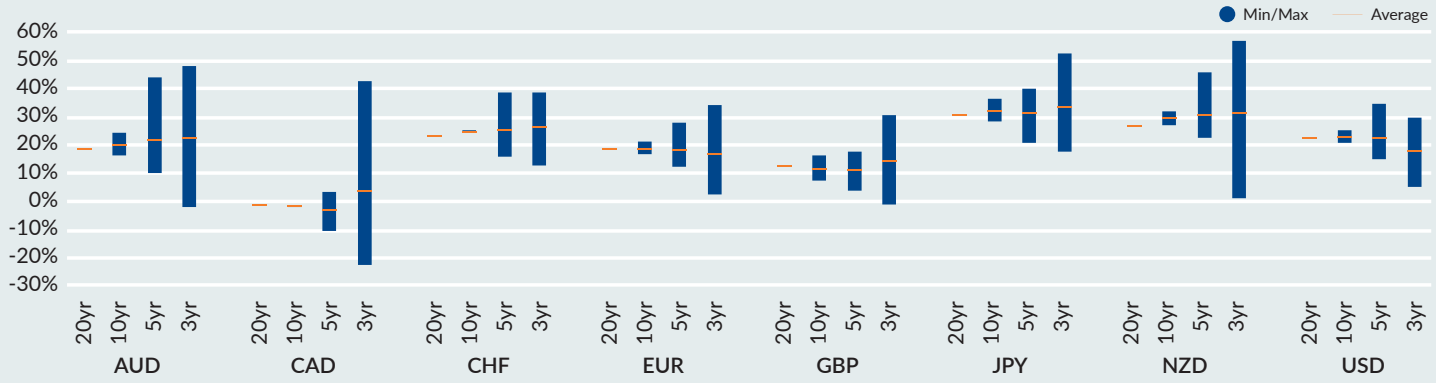
To investigate this further, we took the equity and bond portfolio examples, split the 20-year time period into two 10-year, four 5-year, and almost seven 3-year periods, and calculated the risk contributed by currency in each. In Figure 7 and 8, we plot the maximum, minimum, and average risk contribution statistics for each period, for the hypothetical USD-based equity portfolio and bond portfolio, respectively. In addition, to test whether the base currency of the portfolio has any impacts on the results, we have calculated the same statistics from the perspectives of Australian, Canadian, Swiss, European, British, Japanese, and New Zealand institutions.

As expected, currency tends to contribute more risk within a bond portfolio than within an equity portfolio, regardless of base. Interestingly, over the shorter 3- and 5-year periods, the amount of risk contributed by currency varies significantly, especially within equity portfolios.

For example, while the risk contributed by currency within an Australian-based equity portfolio averaged approximately 21% over each time frame, this statistic episodically increased to 44% and 48% in specific 5-year and 3year periods. These results were mirrored within the other base currencies.

FIGURE 7: **RISK CONTRIBUTED BY CURRENCY IN A HYPOTHETICAL UNHEDGED EQUITY PORTFOLIO: TIME HORIZON ANALYSIS**



Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for International equities is the MSCI World-ex base currency (specified in y-axis) and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

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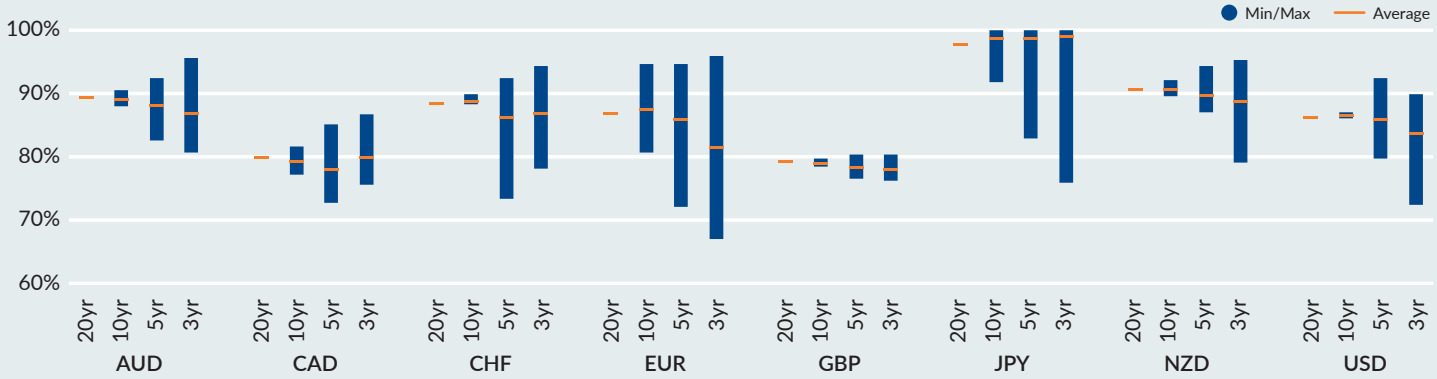
FIGURE 8: RISK CONTRIBUTED BY CURRENCY IN A HYPOTHETICAL UNHEDGED BOND PORTFOLIO: TIME HORIZON ANALYSIS



Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for international bonds is the Barclays Global Aggregate-ex base currency (as specified in y-axis) and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

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Currency overlay

We have seen how adopting a 'do nothing' approach of leaving currency unhedged can not only create uncertainty in terms of returns for an international portfolio, but can also create additional risk in the portfolio, especially over shorter time horizons. A suitable solution to protect against these issues is currency overlay. Currency overlay can be broadly split into two types: passive and active.

Passive overlay

The primary objective of passive currency overlay is to reduce or eliminate the volatility created by the currency exposure of the underlying assets. This is done by selling the currency that the asset exposure is dominated in and therefore creating a hedge. The proportion of the foreign currency sold will depend on the hedge ratio. For example, if the target hedge ratio was 100% then the amount of foreign currency sold would be equal to 100% of the foreign currency exposure; if the target hedge ratio were 50%, then an amount only equivalent to half of the exposure would be sold.

Passive overlay helps to diminish uncompensated risk associated with the exposures unhedged

By hedging out the foreign currency of an international portfolio, passive overlay helps to diminish uncompensated risk associated with unhedged exposures. When the exposures are fully hedged, the portfolio manager will either earn or pay the interest rate differential (IDF), often referred to as carry, that exists between the base currency of the portfolio and the foreign currencies.

A favorable or positive IDF occurs between two currencies when the interest rate of the base country is higher than the interest rate of the foreign country. Since USD has generally experienced a favorable IDF, a USD-based plan sponsor would be paid to hedge the currency exposure by earning the carry. The opposite can occur when carry is negative, i.e., domestic interest rates are lower than those of the foreign countries, thus eroding portfolio returns by paying the carry.

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Figure 9 shows the impact of this for a USD-based MSCI portfolio. The World CCY line illustrates the returns generated by the foreign currency exposure of the portfolio, which is the impact from the currency had the portfolio been unhedged. Here we see two distinct periods of foreign currency depreciation, i.e. US Dollar strength, highlighted in blue, which, had the currency been left unhedged, would have created losses for the portfolio. However, apart from a small dip in the early 1990's, the "carry" has been positive and, had the currency been 100% hedged, the return impact on the portfolio would have been less dramatic as the hedged CCY line in Figure 9 illustrates.

Since the carry component within developed market currencies tends to be fairly low, the case to hedge remains compelling. However, the carry between developed market currencies and emerging market (EM) currencies can be large. Many plan sponsors have preferred to leave EM currency exposures unhedged due to the cost of the carry. However, more plan sponsors are making EM hedging decisions on a currency-by-currency basis, given that some EM currencies now have lower hedging costs.[2]

FIGURE 9: **MSCI WORLD CURRENCY RETURNS VS. US DOLLAR**

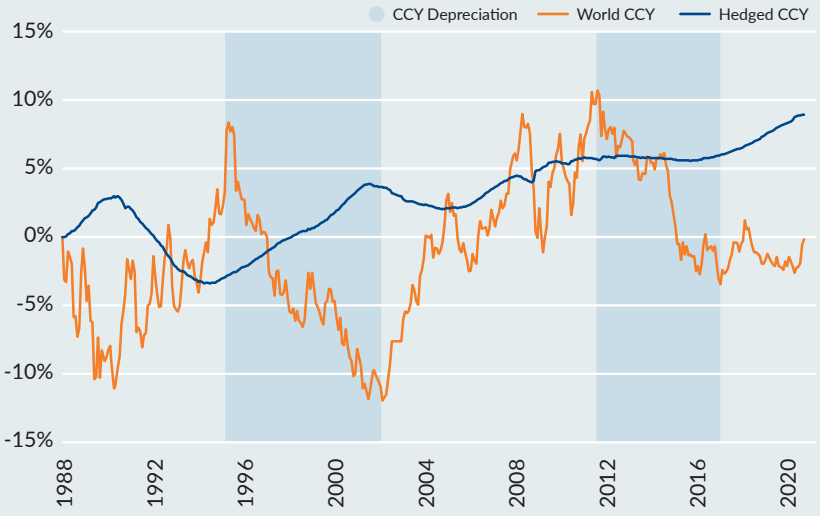

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Figure 10 illustrates the impact of implementing a passive hedge on the hypothetical USD-based international equity portfolio we saw in the previous section. Hedging out the currency risk reduced the overall portfolio risk from 17.56% in the unhedged portfolio to 14.95% in the hedged portfolio. This is further highlighted by comparing the risk contributed by currency in each portfolio; currency contributed 22% of the overall portfolio risk in the unhedged portfolio while contributing 1% in the hedged portfolio.

A similar story is told through the hypothetical USD-based international bond portfolio in Figure 10. As expected, the impact of hedging is even more dramatic with portfolio risk decreasing from 8% down to 2.66% when fully hedged. The risk contributed by currency fell from 87% to 6%.

Results from Figures 10 and 11 indicate that passively hedging the currency exposure can create additional return when compared to the local returns of the equities and bonds. For US-based investors, a 'favorable' interest rate differential led to positive carryover for the period in question.

Passive overlay is an effective way of reducing, or eliminating, the risk associated with leaving the currency exposures of an international exposure unhedged. In addition, passive overlay programs are easy to implement and easy to monitor. Positions are usually taken using forward contracts, but options are sometimes utilized.

However, as the main objective of passive overlay is to eliminate risk, the lack of flexibility to participate in any favorable currency moves can be a drawback. In addition, passive overlay can create the need for substantial cash flow requirements. For example, if the foreign currency strengthens against the base currency, the hedges will incur a loss. Although a rise in currencies creates an unrealized translation gain on the underlying assets, the hedges will generate realized losses that require financing.

FIGURE 10: **PERFORMANCE OF A HYPOTHETICAL USD-BASED EQUITY PORTFOLIO: UNHEDGED VERSUS HEDGED**

	Equities (MSCI - ex USD)	Equity + Currency Unhedged	Equity + Currency Fully Hedged
Annualized Return	3.28%	3.85%	3.93%
Annualized Risk	14.95%	17.56%	15.04%
Return/Risk	0.22	0.22	0.26
Max Drawdown	-51.90%	-55.70%	-51.51%
Max Month	11.49%	13.48%	11.53%
Min Month	-16.55%	-22.46%	-16.48%
Risk Contributed by Currency	–	22%	1%

Source: Mesirow & Bloomberg. Data from January 2000 to December 2020. Proxy for International equities is the MSCI World-ex USD and ex minor currencies. Past performance is not necessarily indicative of future results; actual outcomes may materially differ.

FIGURE 11: **PERFORMANCE OF A HYPOTHETICAL USD-BASED BOND PORTFOLIO: UNHEDGED VERSUS HEDGED**

	Bonds (Barclay Global Agg. - ex USD)	Bonds + Currency Unhedged	Bonds + Currency Fully Hedged
Annualized Return	3.79%	4.24%	4.65%
Annualized Risk	2.60%	8.00%	2.66%
Return/Risk	1.46	0.53	1.75
Max Drawdown	-3.65%	-15.11%	-2.89%
Max Month	2.23%	7.93%	2.15%
Min Month	-2.42%	-6.75%	-2.26%
Risk Contributed by Currency	–	87%	6%

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Active overlay

One of the main disadvantages to a passive hedging strategy is that is limits participation in any positive moves in the foreign currency. For example, consider a US-based portfolio invested in European equities. A 100% hedged portfolio would incur a loss on the forward contracts should EURUSD appreciate. However, if the hedging strategy had the ability to reduce the hedge ratio in anticipation of the move in EURUSD, there would be more opportunity to participate in the Euro's appreciation to create a positive currency return.

An active overlay approach can offer a solution to this – these strategies are designed to adjust the hedge ratio applied to the currency exposures throughout time, with the goal of providing downside protection (in the form of minimizing the risk associated with leaving the currency exposures unhedged) while allowing for upside participation (in the form of maximizing the potential to participate in favorable currency moves).

Figure 12 illustrates the opportunity set of an active overlay program. On the left-hand side of the x-axis, shows the potential losses that could be incurred if the foreign currency depreciates and the exposure if left unhedged (the blue dotted line). In such a period of foreign currency depreciation, an active overlay strategy would seek to maintain a 100% hedge and therefore minimise any potential losses had the exposure been left unhedged. On the right-hand side of the x-axis, shows the potential gains that could be received if the foreign currency appreciates and the exposure if left unhedged. In such a period of foreign currency appreciation, an active overlay strategy would seek to reduce the hedge ratio to (and towards) 0% hedged and therefore maximise any potential gains.

The mechanism by which the adjustments to the hedge ratio are made can either be discretionary in nature, i.e. decided upon using qualitative data and news; or systematic in nature, i.e. the output of a mathematical model. The latter tends to be the most common approach adopted though.

Mesirow's active overlay strategy primarily uses price-based models designed around the premise that directional and range-bound regimes are present in the currency markets, while incorporating discretionary inputs. In some cases, Mesirow may act on a purely discretionary basis, especially in certain jurisdictions. By incorporating models that are designed to capture both trending and mean-reverting tendencies, the active overlay model can foresee potential currency moves regardless of the market backdrop. Discretionary inputs can be beneficial in providing flexibility to deviate from models.

The advantage of an active overlay strategy versus a passive strategy is that it not only seeks to reduce the volatility associated with the currency exposure of the underlying assets, but also aims to enhance portfolio returns by participating in favorable moves in the foreign currency by adjusting the hedge ratio. However, given that overlay portfolios are 'constrained', as in the currency exposures and size of these exposures are determined by the investment in underlying assets, active overlay can never offer the type of returns possible if portfolio decisions are unconstrained. In the next section, we look at currency as an 'asset class' and as source of return.

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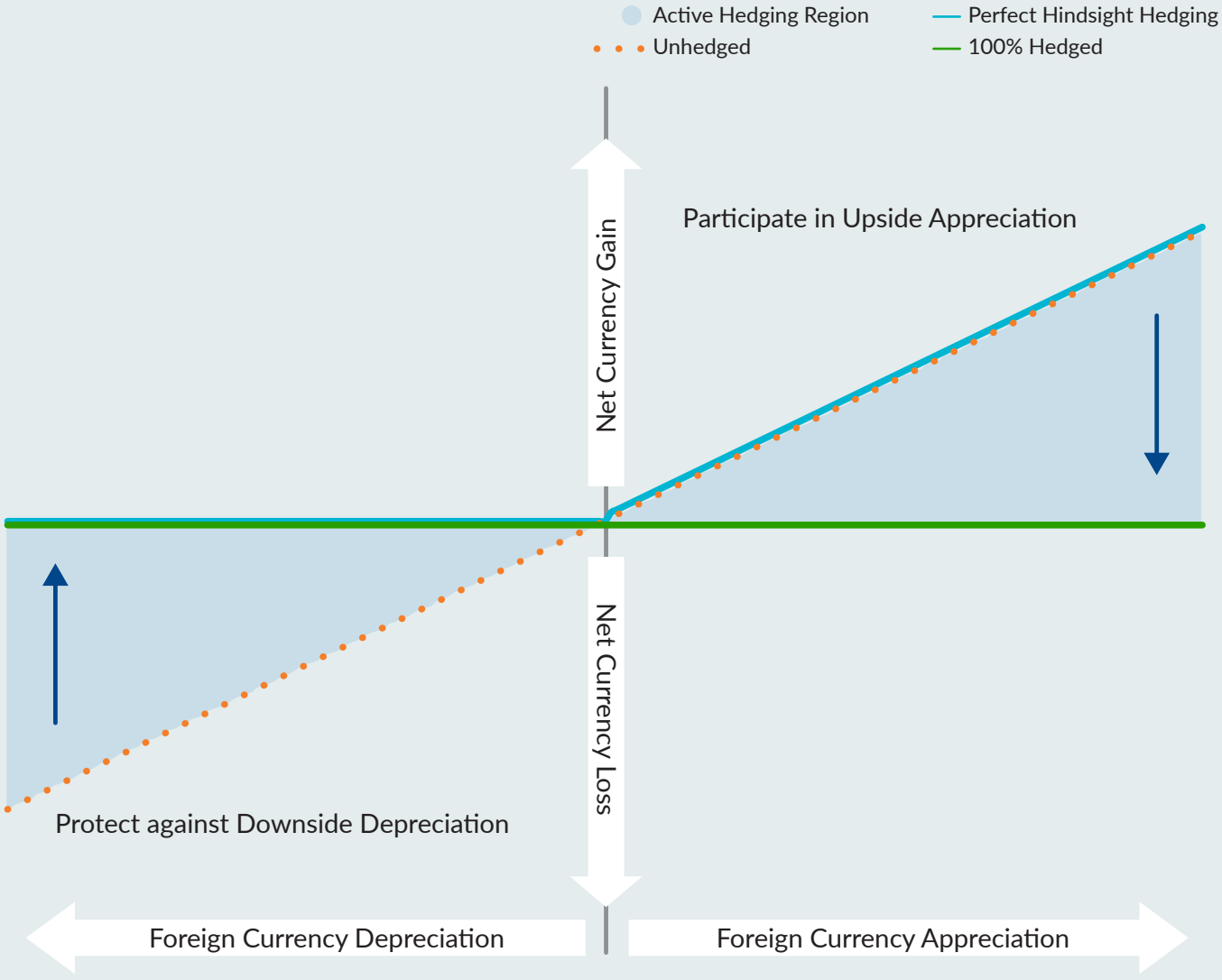
FIGURE 12: **ACTIVE OVERLAY – RISK MANAGEMENT**



Source: Mesirow

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Currency as a source of return

When considering currency as a source of return, broadly speaking there are two types: currency beta (accessible through 'currency factors' or indices); and currency alpha (accessible through 'absolute' currency return strategies). In this section, we will discuss each in turn.

Currency beta

Currency beta is a term which refers to a set of trading strategies that have been designed to capture the main drivers (or trading styles) used within the currency industry. The strategies are applied to a portfolio of currencies, typically G10, to create investable products often referred to as "Currency Factors". The rules underpinning the strategies are transparent in nature and systematic in approach and offer investors a cost-effective way to access potential currency returns.

Research by the likes of Middleton (2005) and Pojarliev and Levich (2007) identified three main 'betas' which could explain a large proportion of the returns generated by currency hedge funds; these were: 1. Carry; 2. Valuation; and 3. Trend/Momentum.

1.

Carry: This is based on the economic theory of uncovered interest rate parity (UIP) and, more specifically, the failure of the parity condition to hold empirically. The UIP theory asserts that the currencies of countries with higher interest rates should depreciate against currencies of countries with lower interest rates. Under UIP, the forward rate of a currency pair should be an unbiased predictor of its future spot rate. However, empirically, the converse has been shown to be true. For example, Delcoure et al. (2003), Pojarliev (2007), and Engel (2016) found that currencies of countries with higher interest rates tended to appreciate against currencies of countries with lower interest rates. This relationship has become referred to commonly as the "forward rate bias" and has led to the popularity of the "carry trade" in which an investor buys a currency with a high interest rate and funds this by selling a currency with a lower interest rate, with the expectation that the former will appreciate against the latter.

2.

Value: This is based on the economic premise of the "law of one price," or what is more commonly referred to as purchasing power parity (PPP). PPP states that a basket of goods in one country should cost the same as an identical basket of goods in another country with the exchange rate between those two countries being the mechanism by which such equilibrium holds.

Froot and Rogoff et al. (1995), Taylor and Taylor (2004), and Taylor (2006), for example, conclude that, over the shorter-term, currencies may deviate from their long run equilibrium or PPP values, but over the medium to long run, currencies tend to revert to fair value. This mean reversion opens up the possibility for trading opportunities for currency because an investor can buy an undervalued currency and sell an overvalued currency with the expectation that each will, over time, revert to their fair values.

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3.

Trend or Momentum: The random walk theory states that the path a price follows cannot be predicted by knowledge of the path it took in the past. However, empirical evidence often suggests otherwise and that past returns can be useful in predicting future returns. In fact, trend-following/momentum has been one of the most popular forecasting strategies used within the currency markets. Although there is no fundamental economic reason why trends should exist in the currency markets, behavioral science suggests that herd mentality and investors' beliefs that the winners of the past will be the winners of the future may explain the behavior. Nonetheless, simple trend-following strategies have been shown to be profitable in the currency markets going back to Taylor (1990), LeBaron (1992) and more recently Orfanakos (2016), and Rohrhach (2017).

Whilst each of the above styles has its own merits, most investors in Currency Beta will opt for a multi-strategy investment product which combines all three.

The benefits of Currency Beta are that it offers investors a cost-effective way of accessing potential currency returns. In addition, as the strategies tend to be straight forward and transparent in terms of the trading rules it uses, the performance of currency beta tends to be easy to understand for the investor.

The disadvantages of Currency Beta are that many strategies are very naïve in terms of the trading rules used and this can lead to losses (the interested reader would be wise to look for Currency Beta products that have been constructed with extras parameters such as risk filter etc as this may mitigate losses). In addition, adjustments to positions for Currency Beta tend to be quite infrequent, usually monthly, this can make it difficult to react quickly if market conditions change suddenly,

On balance though, many investors opt for Currency Beta products as the risk-adjusted returns can be appealing especially considering the competitive cost structure of such products.

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Currency alpha

Currency alpha is a term which refers to a set of trading strategies that have been designed to capture something over and above the 'beta' or main drivers of the currency market. As such, currency alpha programs tend to be built upon sophisticated trading strategies that are adept at seeking out potential opportunities for return. They tend to trade quite frequently, often daily or intraday, and incorporate sophisticated risk management systems designed to mitigate and manage downside risk. Currency alpha strategies can be systematic, discretionary, or a combination of both. There are pros and cons of each and these can be seen in Figure 13.

FIGURE 13: **SYSTEMATIC VERSUS DISCRETIONARY**

	Advantages	Disadvantages
Systematic	• Models are based on mathematic algorithms -developed as part of a rigorous research process • Returns are arguably more predictable given knowledge of historical performance • Risk parameters can be systematized easily	• Data can be difficult to quantify and include in a model • Models require constant monitoring and evaluation to ensure relevance
Discretionary	• Data that can be difficult to model or systematize can be captured into the investment decision • Increased ability to reduce, expand (or abstain) from trading positions in challenging markets • Idiosyncratic risk can be hedged out	• Trading biases • Key person risk • Position size and number of active opportunities may not be similar over time and could lead to an inconsistent risk profile and variable returns

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In general, most currency alpha managers are systematic and will trade a broad basket of global currencies, including both developed and emerging market currencies. Some alpha managers will concentrate on just one trading style, for example trend or momentum, but this may lead to inferior performance if the current market conditions are not suited to that trading style. As such, investing in a currency alpha manager who implements a more diversified approach to trading style may be more sensible.

The benefits of Currency Alpha are that it offers investors access to potentially superior currency returns versus investing in Currency Beta. In addition, the underlying strategies and rules will be more adept at adjusting to and benefiting from changes in market conditions as they have the ability to trade more frequently. The universe of possible currencies to invest in is usually larger for a currency alpha manager than a beta strategy and often includes emerging market currencies. As such, there is a larger opportunity set and this means the potential for returns is maximized.

The disadvantages of Currency Alpha are that many of the underlying strategies can be complicated and sometimes the investor may not feel comfortable investing in black boxes. However, concerns can be eased by finding an Alpha manager who will take the time to explain the underlying mechanism and who appears competent and knowledgeable about their models. Currency Alpha is usually costlier than Currency Beta, but this reflects the greater sophistication of the strategies and the opportunities for additional investment returns.

The objective of this article is to demonstrate the impact that currency can have from the perspective of a risk provider and a return generator. For a risk provider, careful evaluation of an investor's exposure to foreign exchange moves in their international portfolio is worthwhile and can help to determine the magnitude of risk introduced into their portfolio and if managing currency would be beneficial. For a return generator, clients would be wise to investigate the return generating potential of currency in order to fully assess whether an allocation, either through currency beta or currency alpha, could enhance the overall risk adjusted returns of their existing portfolio.

For more information on how our FX programs can be customized in order to meet your investment goals please visit **mesirow.com/currency**.

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To learn more, visit mesirow.com or contact Joe Hoffman at 312.595.7019 or joseph.hoffman@mesirow.com.

1. "Bank of International Settlements Triennial Report 2019," https://www.bis.org/statistics/rpfx19_fx.htm

2. For further information on emerging markets, please see our insight on Emerging Market Currency Risk for U.S. Dollar Investors

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