

# Proxy Hedging: Beyond correlations



Investors hedging currency exposures have many decisions to make, from establishing hedge ratios and strategic benchmarks to setting counterparty concentration thresholds. The composition of an investor's currency exposure may also warrant the use of proxy hedging, where one foreign currency is substituted for another currency of the same notional amount in an overlay programme. This augmentation of a currency hedge can benefit the investor by reducing the number of trades and improving costs by avoiding relatively illiquid currencies while maintaining a low tracking error relative to the currency hedge benchmark. The cyclical nature of risky assets can also decouple otherwise stable correlations, motivating investors to take a holistic approach that goes beyond correlations.

## The use of currency proxies

There are various reasons why proxy hedging may be useful for an investor. Employing proxies can reduce trading costs by not only executing fewer trades, but also substituting illiquid currencies with more liquid currencies. Smart proxy selection can embed fractional carry skews into the portfolio as another cost-saving initiative. Furthermore, certain jurisdictions introduced regulatory changes in the recent past, enforcing mandatory collateralisation of non-deliverable forwards (NDFs). Collateralisation can result in performance drag for the investor's portfolio because of the cash or securities that are set aside for margin payments. A cash equitisation programme may be utilised to alleviate the performance impact but such a solution comes at a cost. Substituting NDFs with deliverable forwards can reduce the operational burden and opportunity costs associated with collateralisation.

When utilising proxy hedging, it is important to weigh the twin objectives of low cost and low tracking error relative to the full basket of currencies. As a case study, we can look at a currency overlay designed to fully hedge the MSCI World exposures to USD. By using a ten-year proxy hedging back-test, we can ascertain the effectiveness of the proxy basket relative to the full basket in hedging the index exposures. As at the end of December 2019, there were fourteen currencies

in the index. To hedge the full basket of currencies, a U.S. investor would take a short position in each of the fourteen currencies vs. the U.S. dollar in the proportions represented in the index.

Studying the index, we can identify currencies that may be suitable proxy targets (see Figure 1). For example, since DKK is currently pegged to EUR and commands only a 0.61% weighting in the index, we can reasonably substitute the exposure with EUR. Indeed, the trading cost of a EUR/USD pair versus that of a DKK/USD pair is in favour of EUR/USD, with spread costs almost four times wider for DKK/USD as at the end of 2019. Additionally, the carry cost paid by hedging EUR/USD is very similar to that which is paid by hedging DKK/USD directly. In our case study, proxy hedging can be extended to other currencies in the basket. Perhaps we may decide to only hedge the G10 currencies, employing proxy currencies of EUR, USD, AUD and NZD for the targets DKK, HKD, ILS and SGD respectively – the construction of this proxy basket (see Figure 2) would be supported by analysing various factors. Of course, for HKD and ILS, using USD as a proxy implies leaving these currencies unhedged. That isn't necessarily an adverse outcome if proxy analyses are supportive.

The ten year analysis uses static currency weights for simplicity and reflects a standard one-month forward contract tenor. The results exhibit very low tracking error (see Figures 3 and 4) against trading the full basket of fourteen currencies. An annualised tracking error figure of 3 bps (see Figure 5) and an R-squared of 0.9999 support our proxy choices. By using USD as a proxy for HKD and ILS, we contribute to saving on transactions costs by trading fewer currencies (10 versus 14);

while we forgo the carry, pick-up associated with hedging ILS directly, we pick up carry by not hedging HKD. The substitution of SGD for AUD delivers a positive carry pick-up. It is important to consider carry in the context of currency weightings in the portfolio.

CURRENCY	WEIGHT	ANN. CARRY PICK-UP	SPREAD COST (1M FWD), BPS	PROXY	CORRELATION TO TARGET (10YR)	CARRY PICK-UP DIFF.	SPREAD COST DIFF, BPS
AUD	2.30%	0.92%	0.61	AUD			
CAD	3.37%	0.20%	0.40	CAD			
CHF	3.11%	2.63%	0.58	CHF			
DKK	0.61%	2.53%	1.05	EUR	pegged	-0.21%	(0.77)
EUR	10.59%	2.32%	0.28	EUR			
GBP	5.47%	1.08%	0.46	GBP			
HKD	1.08%	-0.40%	0.74	USD	pegged	0.40%	(0.74)
ILS	0.11%	1.81%	3.01	USD	n/a	-1.81%	(3.01)
JPY	8.16%	2.06%	0.01	JPY			
NOK	0.21%	0.17%	0.86	NOK			
NZD	0.09%	0.53%	0.59	NZD			
SEK	0.90%	1.81%	0.40	SEK			
SGD	0.43%	0.28%	0.75	AUD	0.7226	0.64%	(0.13)
USD	63.57%	-	-	USD			

Figure 1: MSCI World currency weights and proxy factor statistics, from a USD base currency perspective. Source: Russell Investments, Bloomberg, MSCI. Indicative spread costs via Bloomberg. Data as at 31 December 2019.

CURRENCY	WEIGHT (PROXY BASKET)
AUD	2.72%
CAD	3.37%
CHF	3.11%
EUR	11.20%
GBP	5.47%

Figure 2: MSCI World G10 proxy basket currency weights. Source: Russell Investments, MSCI. Data as at 31 December 2019.

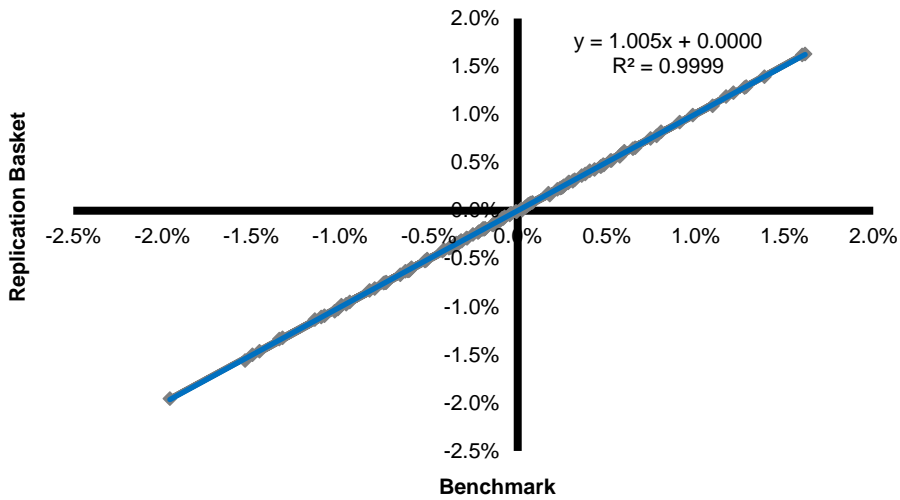


Figure 3: MSCI World hedged to USD (full basket vs. G10 proxy basket) - 10yr analysis.  
 Source: Russell Investments. Data as at 31 December 2019.

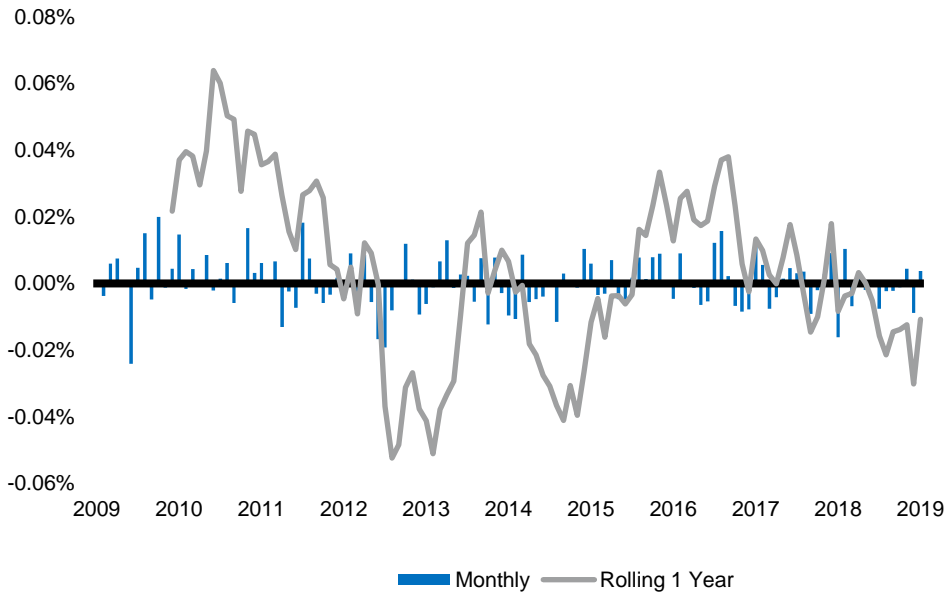


Figure 4: Excess returns of MSCI World hedged to USD - full basket vs. G10 proxy basket.  
 Source: Russell Investments. Data as at 31s December 2019.

<b>Monthly Tracking Error</b>	0.01%
<b>Annualised Tracking Error</b>	0.03%
<b>Minimum Month Excess Return</b>	-0.02%
<b>Mean Month Excess Return</b>	0.00%
<b>Maximum Month Excess Return</b>	0.02%
<b>R-Squared</b>	0.9999

Figure 5: Tracking error and excess returns of MSCI World hedged to USD - full basket vs. G10 proxy basket.  
 Source: Russell Investments. Data as at 31 December 2019.

## What makes a good proxy?

Proxy selections can be detrimental if a naïve approach is taken. For example, simply choosing a highly correlated currency as a substitute for a proxy target completely ignores factors such as the interest rate differential. Robust analyses should consider several factors, which includes correlation analyses, but also the exchange rate regime, cost of carry, liquidity and materiality.

## Correlations

While correlations are useful for proxy selections, a currency manager must be conscious of sample bias when conducting correlation analyses. Capturing a relatively large sample (say ten years) can result in ignoring a regime shift. On the other hand, a dataset with a short horizon (say one year) implicitly expects persistence of present market dynamics. An appropriate middle ground may be to compare correlations using several data sets, using various time horizons, essentially confirming whether correlations hold across time. These expansive analyses provide for a more rigorous and

less generalist study, reducing the probability of evanescent correlations.

Correlation analyses also present a mathematical conundrum when dealing with currency pairs. That is, we cannot measure the correlation of the base currency itself to the proxy target currency. We can look at an example to illustrate this point. Let's say we are a U.S. investor, hedging our foreign currency exposures and as part of that we would like to substitute HKD for a proxy. For this purpose, we may decide to assess the suitability of USD as a proxy for HKD. However, mathematically speaking, there is no correlation between HKD/USD and USD/USD because a correlation does not exist between a variable and a constant (where our constant is  $USD/USD = 1$ ).

In fact, tying oneself to correlations as the absolute arbiter of proxy selections can be misleading. Continuing with our HKD/USD example: a 5-year comparison of correlations suggests there is no single currency that would make a good proxy for HKD (see Figure 6). While most pairs exhibit positive correlation, the correlation coefficients are close to 0. Then, ignoring other factors, there does not appear to exist a plausible candidate with which to proxy HKD.

$p(x,y)$	AUDUSD	CADUSD	CHFUSD	EURUSD	GBPUSD	JPYUSD	NOKUSD	NZDUSD	SEKUSD
HKDUSD	0.1645	0.1277	0.0319	0.0415	0.0681	0.0008	0.1203	0.1237	0.0958

Figure 6: 5-year correlation of daily returns.  
Source: Russell Investments. Data as at 31 December 2019.

However, when we introduce additional factors, most importantly the fact that HKD is pegged to USD and that the interest rate differential between the pair is tight, we are presented with a strong proxy in USD. The case of HKD here, as demonstrated, requires the investor to explore factors other than correlations.

## Exchange rate regime

Several factors underpin the movement of currencies, with varying degrees of predictability. The starting point for analysing any currency should be the current state of the exchange rate regime within which a currency exists. Developed market currencies are typically free-floating, whereas certain currencies in the emerging markets universe operate under managed exchange rate regimes. These regimes are sometimes official hard currency pegs, or otherwise managed more loosely around a peg. At the same time, nations around the world understand the power of relative currency prices as a lever for economic growth and stabilisation. On the other hand, nations must be careful not to disincentivise or disenfranchise market participants through overtly manipulative currency market interventions.

In the case of an official currency peg, that can in fact provide us with a de facto proxy currency without needing to explore other factors that indicate a strong proxy. However, once a currency peg is identified, it is important to apply a qualitative view on the stability of the current peg and remain abreast of country- or currency-specific developments that may impact the robustness of the peg. We will also want to consider the

expected direction of change in exchange rates if the peg were to be removed. Oftentimes however, it is not easy to identify if or when a currency peg might be discontinued, yet it remains prudent to periodically review the currencies operating under such regimes.

## Cost of carry (or the implied forward interest ate)

Although strong correlations and stable exchange rate regimes may signal a suitable proxy, we must not ignore the interest rate differential between the currency pair we decide to trade. Entering a short position in a currency resembles the borrowing of that currency and simultaneous lending of the base currency for delivery at a time in the future. The forward points achieved at execution thus broadly represent the short-term interest rate differential between the two economies. If the interest rate differential is positive in favour of the traded (foreign) currency, that means that on a net basis the investor entering a short position in the traded currency must effectively pay an implicit cost to hedge that currency. This 'cost of carry' is an important consideration when choosing proxies.

---

## Liquidity and trading costs

Proxy hedging may be beneficial in cases where sizing presents problems. For instance, a portfolio that exhibits large monthly turnover in currencies with low average daily volumes could contain potential proxy targets. Otherwise the portfolio may suffer from high trading costs to the detriment of performance.

Spread costs in more readily traded currency pairs tend to be significantly lower than in currency pairs with lower volume. To support transparency and gauge the full effects of proxy hedging, these explicit costs are important to factor into decisions. Indeed, employing a proxy currency that results in higher explicit trading costs should be justified by statistically significant results in the analysis of other factors (e.g., strong positive correlations, beneficial carry differential).

## Materiality

Certain currencies in the hedge basket could have a de minimis weight such that it may be sensible to either proxy hedge or even to leave these currencies unhedged. Not hedging is an active choice, which should be informed by proxy analyses. Otherwise, the portfolio may realise higher tracking error than preferred, particularly in the case where several currencies with insignificant weightings are left unhedged.

To benefit from reduced trade frequency, targets should ideally be proxied to currencies that already exist in the portfolio or they should be left unhedged. This is particularly relevant in the case of currencies with an insignificant weighting, in order to avoid executing nominally very small trades when working within hedge ratio tolerance bands. Avoiding the direct trading of these currencies saves costs (ticket charges and potential collateralisation requirements), while not introducing any material tracking error given the currencies' immaterial weighting.

## Proxy hedging in a volatile environment

Ensuing volatility from the COVID-19 virus outbreak has provided a period of heightened volatility which we can evaluate from the perspective of proxy hedging. We can use our earlier example of a USD investor implementing proxies to hedge a G10-only derivative of the MSCI World basket. Currency volatility started to climb at the end of February as news of virus contagion poured through, accelerating through March as authorities worldwide imposed lockdowns. As such, we can look at the return differential of hedging using the proxy basket compared to the full basket (see Figure 7 and Figure 8). During March, the G10 proxy basket outperformed the full basket by 2 basis points. However, the opposite materialised in April where the G10 proxy basket underperformed the full basket by 2 basis points. Looking closer, we can isolate this to the use of AUD as a proxy for SGD. Quite simply, ignoring weighting, a short position in AUD outperformed a short position in SGD in March for a USD investor by 3.15 percentage points. Conversely, in April, the AUD position underperformed the SGD position by 5.85 percentage points.

The magnitudes of the differences are large, cementing the importance of two particular points we have made in this paper: materiality and data. If the SGD weighting had been significantly larger, the proxy hedge would have suffered from a greater deviation from the full basket. For an investor, the full basket is the target benchmark against which performance is measured. To put this into perspective: each 2.33 percentage point of over or under-performance of AUD (our proxy) relative to SGD (our target) resulted in a 1 basis point over or under-performance against the benchmark (full) basket. Clearly, the immaterial weighting of SGD in the full basket cushions a deeper impact upon a return mismatch. At this point we can highlight the importance of data. Ultimately, a dataset (and back-testing) should sufficiently support a correlation analysis as far as it is a key input in selecting a proxy. Given that a currency hedging programme typically is not put in place for very short time horizons, it is important that a proxy basket does not exhibit directional correlation breakdowns. This may be ascertained from testing and is prevalent in our example where we witnessed an opposite deviation. Market stresses such as we have witnessed require extra diligence in monitoring positions, for all investors.

**MARCH**

CURRENCY	WEIGHT	RETURN	WEIGHTED RETURN
AUD	2.30%	5.15%	0.12%
CAD	3.49%	5.69%	0.20%
CHF	3.25%	0.20%	0.01%
DKK	0.65%	0.19%	0.00%
EUR	10.54%	0.31%	0.03%
GBP	5.20%	3.01%	0.16%
HKD	1.12%	-0.53%	-0.01%
ILS	0.11%	1.47%	0.00%
JPY	8.06%	0.26%	0.02%
NOK	0.19%	9.81%	0.02%
NZD	0.10%	4.45%	0.00%
SEK	0.91%	2.30%	0.02%
SGD	0.43%	2.00%	0.01%
USD	63.64%	0.00%	0.00%
<b>TOTAL</b>			<b>0.58%</b>

**APRIL**

CURRENCY	WEIGHT	RETURN	WEIGHTED RETURN
AUD	1.95%	-6.95%	-0.14%
CAD	3.01%	-2.45%	-0.07%
CHF	3.43%	-0.08%	0.00%
DKK	0.70%	0.26%	0.00%
EUR	9.74%	0.30%	0.03%
GBP	4.78%	-1.66%	-0.08%
HKD	1.10%	0.01%	0.00%
ILS	0.11%	-1.81%	0.00%
JPY	8.66%	-0.79%	-0.07%
NOK	0.17%	-2.73%	0.00%
NZD	0.10%	-4.09%	0.00%
SEK	0.85%	-1.36%	-0.01%
SGD	0.38%	-1.10%	0.00%
USD	65.04%	0.00%	0.00%
<b>TOTAL</b>			<b>-0.35%</b>

Figure 7: MSCI World Currency Hedge Only Returns for March and April 2020.  
Source: Russell Investments, MSCI. Data as at 30 April 2020.

**MARCH**

CURRENCY	WEIGHT	RETURN	WEIGHTED RETURN
AUD	2.73%	5.15%	0.14%
CAD	3.49%	5.69%	0.20%
CHF	3.25%	0.20%	0.01%
EUR	11.19%	0.31%	0.03%
GBP	5.20%	3.01%	0.16%
JPY	8.06%	0.26%	0.02%
NOK	0.19%	9.81%	0.02%
NZD	0.10%	4.45%	0.00%
SEK	0.91%	2.30%	0.02%
USD	64.88%	0.00%	0.00%
<b>TOTAL</b>			<b>0.60%</b>

**APRIL**

CURRENCY	WEIGHT	RETURN	WEIGHTED RETURN
AUD	2.32%	-6.95%	-0.16%
CAD	3.01%	-2.45%	-0.07%
CHF	3.43%	-0.08%	0.00%
EUR	10.44%	0.30%	0.03%
GBP	4.78%	-1.66%	-0.08%
JPY	8.66%	-0.79%	-0.07%
NOK	0.17%	-2.73%	0.00%
NZD	0.10%	-4.09%	0.00%
SEK	0.85%	-1.36%	-0.01%
USD	66.24%	0.00%	0.00%
<b>TOTAL</b>			<b>-0.37%</b>

Figure 8: MSCI World G10 Currency Hedge Only Returns for March and April 2020.  
Source: Russell Investments, MSCI. Data as at 30 April 2020.

---

## The bottom line

Proxy hedging is an important topic that should be given due consideration in any currency management programme. An inadequate analysis could result in larger tracking error or higher trading costs. On the other hand, rigorous analysis and prudent selection of proxies can help to reduce trade frequency; deliver savings on trading costs; and facilitate navigation around illiquidity, while maintaining tight tracking error. To do so, the evaluation should cover a range of factors to support the recognition of suitable proxies. Correlations, exchange rate regimes, the cost of carry, liquidity and materiality should collectively form the foundation. Periodic reviews of proxy analyses should be completed to affirm previous understanding, discern developing trends and ultimately inform current proxy choices.

## Important information

Unless otherwise specified, Russell Investments is the source of all data. All information contained in this material is current at the time of issue and, to the best of our knowledge, accurate. Any opinion expressed is that of Russell Investments, is not a statement of fact, is subject to change and does not constitute investment advice.

The value of investments and the income from them can fall as well as rise and is not guaranteed. You may not get back the amount originally invested. Any past performance is not necessarily a guide to future performance. Any forecast, projection or target is indicative only and not guaranteed in any way. Any reference to returns linked to currencies may increase or decrease as a result of currency fluctuations. Indexes are unmanaged and cannot be invested in directly.

Issued by Russell Investments Limited. Company No. 02086230. Registered in England and Wales with registered office at: Rex House, 10 Regent Street, London SW1Y 4PE. Telephone +44 (0)20 7024 6000. Authorised and regulated by the Financial Conduct Authority, 12 Endeavour Square, London E20 1JN. Russell Investments Ireland Limited. Company No. 213659. Registered in Ireland with registered office at: 78 Sir John Rogerson's Quay, Dublin 2, Ireland. Authorised and regulated by the Central Bank of Ireland. Russell Investments Limited is a Dubai International Financial Centre company which is regulated by the Dubai Financial Services Authority at: Office 4, Level 1, Gate Village Building 3, DIFC, PO Box 506591, Dubai UAE. Telephone +971 4 578 7097. This material should only be marketed towards Professional Clients as defined by the DFSA.

KvK number 67296386.

© 1995-2020 Russell Investments Group, LLC. All rights reserved

MCI-02112/31-03-2021 EMEA 2071 TV0431