

A Practical Guide to Hedging Foreign Currency Exposure in Endowment Portfolios

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The best risk-adjusted returns available to investors could be anywhere in the world and therefore an optimally invested, long-term portfolio will have exposure to foreign assets. Investors who own foreign assets and spend domestically have an asset-liability mismatch; the currency exposure of their portfolio diverges from the currency exposure of their expenditure. In this paper we discuss whether investors should hedge this exposure back to their spending currency, which key factors to consider in determining the optimal level of currency hedging, and finally how a hedging strategy should be implemented in practice.

The primary audience for this paper is UK-based institutional investors where a significant proportion of their portfolios' underlying currency exposure is in US Dollars. Therefore, the discussion and examples provided in this paper will focus on Sterling investors seeking to hedge US Dollar exposure. However, these principles remain applicable more broadly for non-Sterling investors, or to those seeking to hedge a currency other than US Dollars.

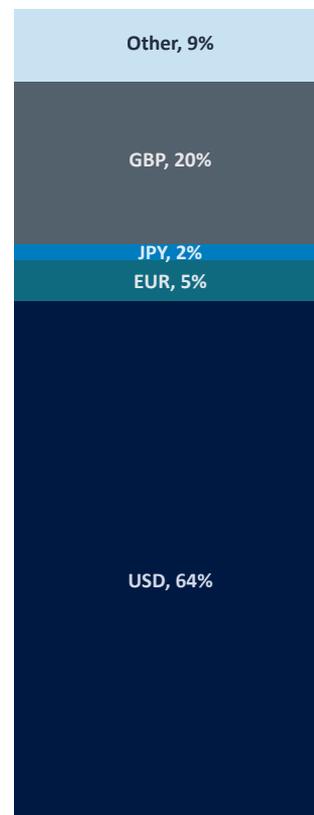
What is Currency Risk?

Currency risk can be defined as the risk that an unfavourable move in the exchange rates between the currencies of a portfolio's assets and liabilities will reduce the portfolio's purchasing power. Given the efficiency of currency markets, there is little evidence that these moves can be reliably predicted in advance (discussed further below). For example, if an endowment spends purely in Sterling and invests purely in US Dollars, an unexpected +20% increase in the value of Sterling versus the US Dollar corresponds to a -20% reduction in the purchasing power of the portfolio in its spending currency. Institutional investors by nature have a long-term time horizon, but even a long-term

investor may be forced to crystallise currency-related losses if non-Sterling investments are liquidated at unfavourable exchange rates to settle Sterling-denominated liabilities.

Assuming there is no currency hedging in place, a typical Sterling investor with an endowment-style asset allocation might expect only c.18% of their portfolio's assets to be denominated in their home currency, with the remaining 82% denominated in a variety of other currencies, as shown in Exhibit 1.

Exhibit 1: In the absence of hedging, a typical endowment asset allocation mostly comprises US Dollars



Source: Partners Capital calculations. Long term SAA allocations. Allocations, indexes, and currency exposures can be found in Appendix A.

Currency risk also consists of the added portfolio volatility produced by unhedged currency exposures. For example, the annualised standard deviation of Sterling versus US Dollar has been c. 9% per year over the last 30 years. Leaving currency exposure unhedged could therefore increase the volatility of portfolio returns as measured in the home currency, although this depends on the correlation of the unhedged currency to the portfolio’s performance (discussed in more depth later). We view this risk as being of secondary importance compared to the risk of a reduction in long-term purchasing power resulting from adverse currency moves.

Partners Capital’s View on Currency Risk

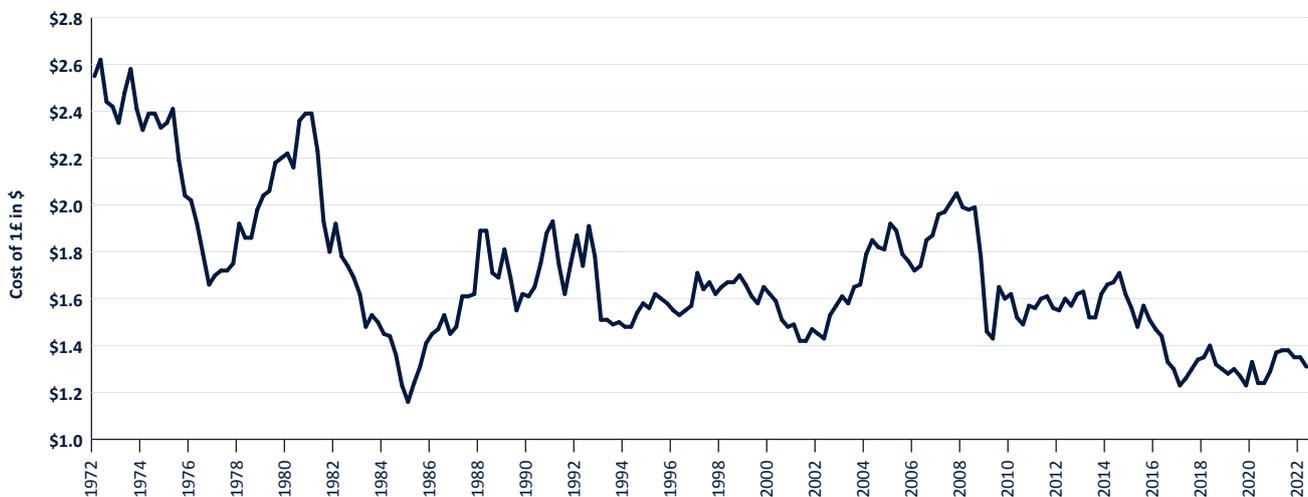
The default starting point for any investor seeking to determine an appropriate currency policy is to match the denomination of the portfolio’s assets to those of its liabilities, as the unpredictability of currency markets might suggest that investors are typically not compensated for currency risk in the form of excess returns.

However, some investors with long-term investment horizons might question whether one should simply refrain from hedging foreign currency exposures altogether in the confidence that they will average out to near-zero impact on the portfolio over time as currencies “mean revert”. However, there is

scant evidence that currencies mean revert over a long time horizon, and substantial risk that the potential cost of making that incorrect assumption could be very high. For example, Sterling has declined in value versus the US Dollar from c. \$10 (in 1864) to \$1.1 (in 1985), demonstrating it would have been costly to assume a “mean” equilibrium level between the currencies. Over this period, the UK has moved from being the world’s pre-eminent economy at the turn of the 20th Century to its current position as the sixth largest. Over the same period the US has become the world’s largest economy, with little evidence to suggest that this trend will “mean revert”. Much theory, and indeed academic evidence, focuses on the time period spanning the post-Bretton Woods¹ era (i.e. post-1971), which happens to have coincided with a period of US economic dominance. We would caution against assuming that a currency pair will revert to its historic mean, or indeed that long-term currency trends can be predicted with a high degree of confidence, and treat any historical back-test with scepticism as to its forward-looking efficacy.

¹ Bretton Woods was a system established following the Second World War to encourage development and international economic cooperation, with all partaking central banks agreeing to maintain fixed exchange rates versus the US Dollar. The US Dollar was itself quoted as a fixed price to Gold. However, US stagflation in the 1970s, and a devaluation of the US Dollar from 1/38 to 1/42 of an ounce of Gold, led to a run on Gold reserves. In 1971, Nixon unhooked the valuation tie altogether and the Bretton Woods system ceased.

Exhibit 2: USD/GBP has exhibited considerable volatility, with a slow trend downwards, over the last half-century (1972 – 2022)



Source: Bloomberg

Another common argument for leaving currency exposure unhedged is that selected exposure to certain currencies can be additive to investment return, if one can correctly forecast which currencies will appreciate in value. Our experience suggests that forecasting the future direction of foreign exchange rates is perhaps one of the most difficult investment decisions to get right. Currency markets are amongst the most efficient of global markets, pricing information in rapidly enough that it is rare for any investor to identify mispriced currency pairs successfully and consistently. In the absence of rare dislocations deemed to be temporary, we typically eschew any attempt to forecast exchange rates. Our base-case assumption is that any currency pair is efficiently priced (i.e. has an expected return explained primarily by the difference between the risk-free interest rates of the two currencies), but has a very wide range of potential outcomes around that base case over both long- and short-term horizons.

Therefore, in a purely theoretical paradigm where investors are not compensated for the incremental currency risk they bear, and where they do not have any knowledge that would give them an advantage in predicting future currency directions, they should seek to hedge unwanted foreign currency exposure to minimise the mismatch between their portfolio's assets and liabilities.

However, there are practical considerations that must be evaluated which could prevent investors from hedging all of their currency risk. Before discussing these considerations, we first explain the mechanics of how we hedge foreign currencies in endowment-style portfolios.

How Partners Capital Implements Foreign Currency Hedges

There are several potential methods for implementing a currency hedging programme; Appendix B provides a full list and an appraisal of their relative merits. Where currency-hedged share classes are not available, our preferred approach is to enter into forward currency contracts with a suitable counterparty, usually a custodian bank. We favour forward contracts over other instruments because of their relative availability, liquidity, simplicity, and cost advantages.

While this method is our preference, implementing a currency hedging programme through forward contracts can place a liquidity burden on portfolios. Liquidity is required to ensure that hedging contracts can be maintained since they must be collateralised by highly liquid instruments (e.g., cash, government bonds, public equities, daily- or weekly-traded funds), and the portfolio must be constructed in such a way that any arising settlement losses can be satisfied whilst maintaining the desired level of hedging.

We take an approach in our client portfolios to partially mitigate this burden by splitting the currency hedge across several forward contracts, staggering maturity dates so that they fall due for settlement at periodic intervals. In the event of hedge losses arising from adverse currency moves, settlement dates for those losses are spread across more dates, reducing the liquidity burden placed on a portfolio. We recommend that investors do not have any single contract worth more than 10% of their portfolio's nominal value settling at any single maturity date, with the furthest maturity date being 12 months out. For example, a client required to place a hedge with a total notional value of 40% of the portfolio's value would do so with 4 x 10% notional contracts, each with maturities three months apart. We do not recommend contracts exceeding 12 months' maturity, as pricing is typically less competitive. This approach weighs the benefit of reducing the liquidity constraint on the portfolio against the operational burden of recalculating and rolling hedges on a more frequent basis. A three-month separation between each contract also allows sufficient time for illiquid investments such as Private Equity and Private Debt, which typically report quarterly performance with a lag, to complete a valuation cycle between each hedge placement.

Now that we have discussed our preferred approach for implementing a currency hedging programme, we should now consider the factors that influence the extent to which an investor should aim to hedge.

How Partners Capital Assesses a Target Currency Hedging Level

Whilst every portfolio's currency policy must be assessed on an individual basis, the key considerations outlined in the framework below apply to all portfolios. We follow six steps which can be thought of as a "how-to" guide to determine a currency hedging strategy. The first five considerations are important factors in setting a target currency exposure in a portfolio, whilst the final step determines the range of currency exposures that could be tolerated around that target. Below, we provide summaries of each consideration along with a table showing two example portfolios and how we might apply this framework in practice. Certain sections have more detailed expositions in the Appendices for those seeking further detail.

1. Denomination of Liabilities

The first stage of our approach is to consider where the investment proceeds of the portfolio are ultimately destined, determining what currency those liabilities are denominated in. As previously discussed, as a basic starting point we believe that investors should minimise asset-liability mismatches between their assets (i.e. the mix of currencies in their portfolio) and liabilities (i.e. the currency denomination of the ultimate destination of funds).

2. Look-through Exposure of Liabilities

We caution that investors should consider the "true" currency exposure of their liabilities, beyond just the price tag in which liabilities are denominated. Whilst it may not be expedient, or even possible, to conduct a granular breakdown of the ultimate exposure of all future portfolio spending, we would recommend institutions consider both the extent to which they are required to remain globally competitive and the extent to which "imported inflation" affects their long-term spending. For example, although a UK-based university (whose largest expenditure is typically on salaries) may pay their academic staff in Sterling, those academics will (to an extent) expect to be compensated appropriately versus international competition in what is a global labour market.

3. Emerging Market Currency Exposure

Emerging market currencies are often either difficult or not cost-effective to hedge, due to higher transaction costs and interest rate differentials. In addition, forward contracts with an emerging market currency leg typically confer higher margin requirements on portfolios. This can be compounded by the presence of capital controls in some emerging market countries, and the corresponding lower liquidity and availability of derivative contracts required to hedge. As a result, the MSCI Emerging Markets Index in local currency has outperformed the US Dollar hedged version of the index by over 2% per annum on average since inception². Emerging market currencies typically comprise 8-12% of our average client's foreign currency exposure, and for the reasons discussed above we do not typically recommend hedging this exposure.

4. Achievable Sterling Exposures with Illiquid Assets

As discussed earlier, an operational consideration of currency hedging programmes is that derivative counterparties require investors to place liquid assets as collateral to support hedge contracts. There are thus two areas vying for liquidity in the portfolio – an illiquid portfolio that reduces available liquid assets (and requires liquid assets to fund capital calls) and a hedging programme that requires liquid assets to provide collateral for the contracts and to meet ongoing settlement liabilities. This critically important trade-off creates an upper limit on the quantum of currency hedging an investor may be able to support in addition to that achievable by assets "naturally" denominated in home currency. We define natural here to mean either investments where the underlying assets are Sterling-denominated (e.g., government bonds) or where the investment is held in a share class that offers hedging back to Sterling within the vehicle.

As a result of a portfolio's competing liquidity requirements, investors with a low "natural" home currency exposure may be required to balance the prospect of higher expected returns arising from illiquid assets against the level of currency risk with which they are comfortable. In general, we believe that illiquid assets offer a meaningful "illiquidity premium" over the long term, and many investors

² Source: Bloomberg

may be unwilling to sacrifice this additional return in exchange for reduced currency risk. For investors with a long enough time horizon, the benefit of earning an additional return from illiquid assets is such that currencies would have to move to extremes to justify currency hedging as the optimal use of a scarce liquidity budget. Therefore, we generally advise investors to try to maximise their illiquid allocation to deliver the highest returns, within other constraints on the portfolio. Investors should then seek to hedge as much of the portfolio as possible toward the “target” hedge ratio without compromising their asset allocation. Please refer to Appendix C for further rationale.

5. View on Diversification Benefits of Foreign Currency

So far in this paper, we have treated unhedged currency as a risk to be mitigated. However, evidence suggests that some currencies (particularly US Dollar, Swiss Franc and Japanese Yen) exhibit “safety net” properties which may be desirable to some investors who wish to protect their portfolio in stressed market environments. Unhedged exposure to these “safety net” currencies may provide some diversification benefit if they exhibit a negative correlation to risk markets. In addition, significant hedging of “safety net” currencies can result in portfolios facing a liquidity strain at an inopportune time, whereby investors are forced to settle currency hedge losses at the same time as a drawdown in risk assets (i.e. “safety net” currencies, which have been sold forward, appreciate at the same time as risk assets fall, resulting in potential forced sales of depressed assets to settle derivative settlement obligations). Taking these factors into account may encourage some investors to hedge less of their unwanted currency exposures than they might otherwise have done. Please refer to Appendix D for further rationale.

6. Tactical Implementation Range Due to Hedging “Costs”

We recommend that investors implement a range around their target currency exposures to allow for tactical positioning based either on a forward-looking currency view, or a view on the cost of hedging (including both the interest rate differential and any additional basis) relative to the volatility or risk of the unhedged currency. In rare instances, the range will also allow scope to benefit from

dislocations deemed to be temporary in nature. Appendix E explores the costs associated with currency hedging in further detail.

The key consideration for how an investor may move within a target currency range is the relative attractiveness of the interest rate differential compared to the annual volatility of the given currency pair and/or the portfolio diversification benefits resulting from exposure to an unhedged currency (as discussed in section 5). For example, a Sterling investor hedging US Dollars should weigh up the interest rate differential between Sterling and US Dollars, the volatility of the currency pair, and the expected diversification benefit of owning US Dollars to determine where they wish their portfolio to sit within their target range. The width of that range should be determined by the investor’s belief that they could tactically move within the range in a way that is accretive to risk-adjusted returns. Please refer to Appendix E for further detail.

Conclusions

A portfolio’s currency policy ultimately rests on the trade-off between the risk that unhedged currency will reduce the long-term spending power of the portfolio and the cost – both direct and indirect – of reducing that risk. The answer to this trade-off will depend on several investor-specific factors, such as the target level of illiquidity, the asset allocation and expected composition of the liquid portion of the portfolio, the availability of cost-effective currency-hedged share classes, and the approach to leverage in the portfolio concerning derivatives and long-term borrowing. In Exhibit 4, we provide some examples of well-known endowment portfolios, highlighting the range of currency targets adopted in the UK institutional investment world.

Regardless of the currency level decided by investors, our strong recommendation is for an explicit currency policy including (at least) a target allocation to their home currency. Manager selection decisions should be made independently of currency considerations, and we do not generally advocate a policy whereby a portfolio’s currency allocation is simply the natural (and unintentional) consequence of asset allocation and manager selection decisions. Portfolio currency exposures should be continuously monitored to ensure adherence to limits, and we undertake regular rebalancing of currency exposures to ensure portfolios remain in-line with their targets.

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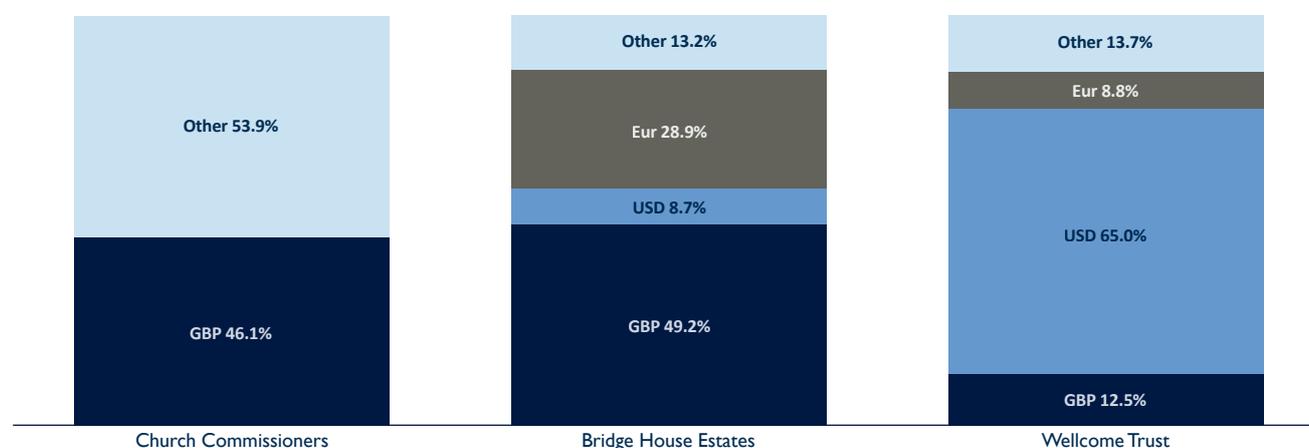
Exhibit 3: Case study examples of setting a currency target and range

Step	Example Investor A UK Charitable Foundation (supporting global research)		Example Investor B UK Secondary School Endowment	
	Considerations	Impact on hedging target	Considerations	Impact on hedging target
1. Denomination of liabilities	95% of grants are given in Sterling.	+95%	95% of costs are in Sterling.	+95%
Initial Hedging Target		95%		95%
2. Lookthrough exposure of liabilities	Research is global and underlying costs are sometimes in US Dollars, or rise in line with US inflation. c.30% of Sterling-denominated spend is estimated to be linked to US Dollar.	-30%	Costs are entirely Sterling on a look-through basis, reflecting the domestic nature of spending.	–
'Ideal' Hedging Target		65%		95%
3. Emerging Market currency exposure	The foundation has a 10% target allocation to Emerging Markets. This 10% allocation can be absorbed by the 35% already earmarked for non-Sterling assets.	–	The endowment has a 15% target allocation to Emerging Markets. As the client would otherwise target 95% Sterling, they must reduce their target Sterling allocation to 85%.	-10%
Maximum Achievable Hedging Target		65%		85%
4. Desired exposure to illiquid asset classes	The foundation targets an asset allocation with a 30% allocation to illiquid investments. Stress testing suggests the portfolio could support a notional hedge of 60% of the portfolio's value which, when combined with a "natural" Sterling level of 15% means that a 75% Sterling level can be achieved. Therefore, the investor is not forced to choose between mitigating currency risk and benefiting from an illiquidity premium.	–	The portfolio targets an asset allocation with a 45% allocation to illiquid investments. Stress testing suggests the portfolio could support a notional hedge of 40% of the portfolio's value which, when combined with a "natural" Sterling level of 10% means that only a 50% Sterling level can be achieved. Here, the portfolio can only achieve a 50% Sterling target before compromising its asset allocation.	-35%
Maximum Desirable Hedging Target		65%		50%
5. View on diversification benefits of foreign currency exposure	Has natural exposure to several "safety net" currencies (JPY, CHF, USD) and likes the potential diversification that they may offer in a stress event. Also believes a lower hedge will place less cash strain on the portfolio in a stress scenario offering flexibility.	-10%	Does not have a view on diversification benefits, and does not want to rely on historical relationships to provide diversification going forward. Does not affect the view of target hedge ratio.	–
Target Hedge Ratio		55%		50%
6. Tactical implementation range	Prefers to avoid paying high levels of basis cost when not suitably compensated for risk reduction.	Wide Range	Prefers to maintain currency target regardless of prevailing interest rate differentials and costs.	Narrow Range
Target Hedge Range		45-65%		48-52%

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Exhibit 4: Example large UK endowment currency exposures (net of hedging)



Note: Several large UK endowments do not make their currency exposures publicly available.

Sources: Church Commissioners Annual Report 2020, Bridge House Estates - Annual Report & Financial Statements for the year ended 31 March 2020, Wellcome Trust Annual Report and Financial Statements 2021

Appendix A – Currency Exposure of Partners Capital SAA

Exhibit 5: Assumed exposures of underlying asset classes for UK investors

Asset Class	Target Allocation	Recommended Benchmark	USD	EUR	JPY	GBP	Other
Cash	1%	UK 3-Month T-Bills	–	–	–	100%	–
Government Bonds	5%	FTSE UK Gilts All Stocks	–	–	–	100%	–
Liquid Credit	–	Barclays Global High Yield TR Index	80%	18%	–	2%	–
Private Debt	5%	Barclays Global High Yield TR Index	80%	18%	–	2%	–
Absolute Return	12%	HFRI: Conservative Index	100%	–	–	–	–
Hedged Equities	11%	HFRI: Strategic Index	100%	–	–	–	–
Global Equities	36%	MSCI ACWI Index	61%	8%	6%	4%	22%
Private Equity	18%	Balanced Investible PE Exposure	84%	7%	–	2%	8%
Inflation Linked Bonds	5%	FTSE UK IL Gilts All Stocks	–	–	–	100%	–
Core Property	–	MSCI UK IMI Core Real Estate	–	–	–	100%	–
Private Equity Real Estate	7%	MSCI UK Real Estate	–	–	–	100%	–
Total			64%	5%	2%	20%	9%

Source: SAA shown is the Partners Capital 2022 SAA for a Sterling investor. Index exposures sourced from the index providers shown, and Bloomberg.

Note: Balanced Investible PE Exposure assumes a 25% allocation to Condor vintages IX – XII. The Condor vehicles are Partners Capital's multi-manager pooled vehicles.

Appendix B – Explanations and Considerations for Potential Methods of Currency Hedging

- **Forwards:** a contract that obligates two parties to exchange a currency pair at a specific rate, on a specific date. These contracts are usually non-deliverable, meaning only the profit or loss accruing to each side is settled at the expiry of the contract. In practice, hedging currency via forward contracts means that currency gains (losses) in a portfolio are offset by corresponding losses (gains) on the currency forward contract, settled at the contract's expiry. These contracts are more liquid and less complex than other options.
- **Currency-hedged share classes:** some funds allow investors the option to invest in various currency-hedged versions of their funds. By investing in a currency-hedged share class, investors place the operational burden onto the asset manager to achieve hedged exposure. Managers typically implement their currency hedging via forward contracts, as described above. Investors need to ensure that the hedging programme implemented by the manager successfully achieves the desired currency allocation in a cost-effective manner. However, currency-hedged share classes will not exist for all investment types and attempting to achieve a particular exposure through hedged share classes alone can greatly restrict the investment universe and incur high costs.
- **Futures:** like a forward, the selling of a futures contract is an agreement to exchange a currency pair at some point in the future. Different to forwards, futures are standardised contracts and marked-to-market daily, meaning investors are forced to continually post margin against the contract. This typically results in an increased liquidity requirement and reduction in the portfolio's flexibility and we therefore do not favour this method.
- **Swaps:** a single period currency swap and a forward contract are equivalent. Most currency swaps will be multi-period in nature and akin to a series of forward contracts. The pricing of these contracts is largely similar to forwards and most

portfolio custodians already have the operational capacity to trade forwards, which provide more flexibility, whilst currency swaps require an ISDA Master Agreement, which could place significant operational obligations on investors.

- **Options:** a Sterling investor could hedge their US Dollar risk by buying a put option to sell an agreed amount of US Dollars at a fixed price in the future. Where a forward contract requires the exchange of an agreed currency pair at a point in the future, a currency option is a contract that gives the right but not the obligation to exchange at or before a point in the future. This means that investors are not equally compensated for moves in one direction as they are penalised for moves in the opposite direction, and must pay an option premium for that flexibility regardless of the currency move. This conditionality of an option contract creates a situation whereby the currency exposure of the investment portfolio is variable (due to the convexity inherent in an option) whilst the liabilities remain fixed. We generally view this variability of exposure as undesirable.
- **Investing in local currency assets via derivatives:** investors who pursue an alpha/beta separation approach, whereby market exposures are partially achieved via derivatives, also achieve "local currency returns" (i.e., excluding the impact of any changes in exchange rates) from some of those derivative investments. For example, a Sterling investor who purchases the E-mini S&P 500 Futures contract has no direct currency exposure requiring hedging, although they must carefully manage second-order currency effects (i.e. the contract's notional exposure as a proportion of their portfolio will fluctuate as exchange rates vary, and the investor should ensure the unrealised profit/loss and collateral on the contract is appropriately hedged). This approach avoids exposure to foreign currency as part of the portfolio's leveraged notional exposure, but the remaining unencumbered cash allocated to active managers would need to be appropriately hedged using one of the above methods.

- Issuance of foreign currency debt:** theoretically, an investor could synthesise a currency forward contract by issuing foreign currency debt and investing the proceeds in home currency assets. For example, a Sterling investor could issue US Dollar debt, and invest the proceeds in the equivalent maturity Gilts. This asset-liability mismatch (i.e., an excess of Sterling) would offset the opposing asset-liability mismatch in their portfolio (i.e., an excess of US Dollars), providing an effective hedge. Although such an arrangement obviates the need for the liquidity-consuming frequent settlement associated with derivatives, it is a highly inflexible tool that incurs high costs. Not only would an investor be required to pay placement and arrangement fees to issue debt, but owners of the debt would also require additional remuneration in the form of credit spread and term premium to be compensated for the increased risk they bear versus a derivative counterparty. Although issuing foreign currency debt is an inefficient means to solely achieve a portfolio hedge, investors with a desire to hedge currency who are already considering borrowing

to lever their portfolio should consider whether doing so in a foreign currency might ease the liquidity burden placed on their portfolio from hedging with derivatives.

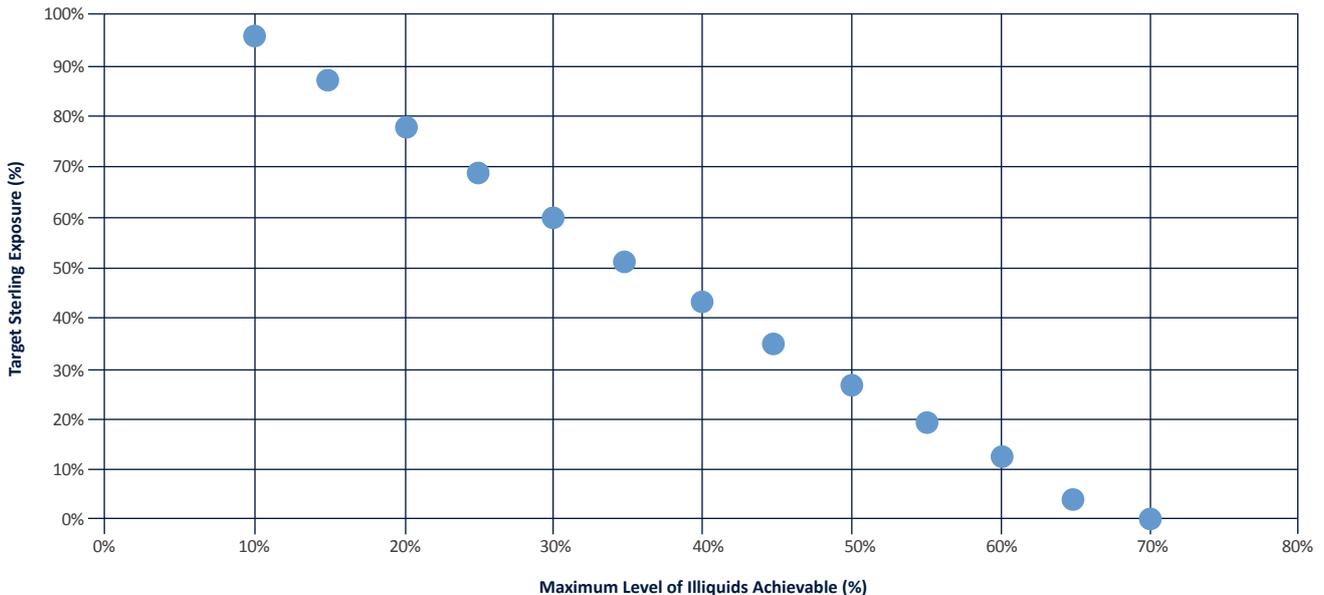
Appendix C: Achievable Sterling Exposures with Illiquid Assets

We define illiquid investments as those with an expected life cycle of greater than seven years. These investments are typically commitment based, with capital called over a 1- to 5-year investment period and returned through distributions to investors over a 7- to 15-year period. For most investors, we continue to recommend a high allocation to illiquid assets (e.g., Private Equity, Debt and Real Estate), due to the additional return those assets typically generate.

As discussed earlier, a currency hedging programme implemented via derivatives competes for liquidity against an illiquid investment programme.

Due to the commitment-based nature of many illiquid investments, portfolios need to be managed with sufficient liquidity to meet capital call obligations

Exhibit 6: The maximum achievable sterling exposures declines as the allocation to illiquid assets increases (illustrative)



Source: Partners Capital calculations.

Note: The maximum achievable Sterling exposure is calculated by determining an illustrative portfolio’s ability to meet all liabilities in a stress scenario. In this illustration, we have assumed a portfolio with an annual spending rate of 4% and an equity-equivalent risk of 0.60, and subjected it to a stress scenario in which it suffers an adverse currency move of 50%, simultaneous to a decline in equities of -30%.

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in addition to ongoing spending requirements. Furthermore, much of the investable universe of such investments is denominated in US Dollars. As a result, it is impractical for any portfolio to have a long-term allocation to illiquid assets above c.70%. The level of liquidity required to support a currency hedging programme is sensitive to assumptions regarding the maximum currency loss that might be sustained, the expected portfolio spend rate and the proportion of illiquid fund commitments that must be held to fund future capital calls. As such, Exhibit 6 below should be viewed as illustrative and understood as unique to each investor’s circumstances.

One can see from Exhibit 6 that as the allocation to illiquid assets increases, the size of the currency hedge that can be supported by the portfolio falls. For example, a portfolio targeting a 70% exposure to Sterling is expected to be able to support a long-term illiquid allocation of approximately 25%. This presents a trade-off for investors between the long-term benefits of accessing the higher expected returns from illiquid assets and the risk of unhedged exposure to non-Sterling currencies (typically US Dollars). In Exhibit 7, we quantify this trade-off by comparing the additional expected return that can be achieved by a portfolio through investing in illiquid assets versus the additional risk of loss that a reduced Sterling exposure presents.

Reviewing the implications of Exhibit 7, a Sterling investor targeting a 20% allocation to illiquid assets cannot hedge their portfolio to 100% Sterling, leaving 7.6% unhedged as a result of the illiquid allocation impinging on the portfolio’s ability to support a hedge. However, this 20% allocation to illiquid assets is expected to improve the portfolio’s cumulative returns by +12.8% over a 10-year period. If we assume the portfolio’s currency exposures are routinely rebalanced to target levels, the performance improvement from illiquid investments over 10 years is greater than the potential losses from leaving 7.6% unhedged even in the most draconian assumption of a complete depreciation of the US Dollar. At higher levels of illiquidity (and consequently lower levels of currency hedging), it is conceivable that currency-related losses from an adverse currency move are large enough to more than offset the performance improvement from illiquid assets. At an illiquidity level of 50%, we estimate that an investor would be required to leave 68% of their portfolio unhedged and could therefore see the gains resulting from a higher allocation to illiquid assets offset by losses if Sterling were to appreciate versus US Dollar by c.34%. It is worth noting that this analysis considers the performance improvement from allocating to illiquids over a 10-year time horizon. For investors with a longer time horizon, the benefits from allocating to illiquids are

Exhibit 7: There is a trade-off between the expected benefit of illiquidity premium against potential currency loss (illustrative)³

Portfolio illiquidity level	Maximum level of achievable Sterling exposure	Expected cumulative performance improvement from illiquid investments over 10 years	Appreciation of Sterling versus US Dollar at which performance improvement is negated over 10 years
0.0%	100.0%	–	N/A
10.0%	100.0%	6.3%	N/A
20.0%	92.4%	12.8%	N/A
30.0%	71.0%	19.6%	58.8%
40.0%	51.0%	26.6%	40.1%
50.0%	32.0%	33.8%	33.8%
60.0%	14.0%	41.3%	30.8%

Source: Partners Capital forward-looking assumptions.

Note: Assumes a two-currency portfolio of Sterling and US Dollars for simplicity.

³ Expected performance estimates are based upon simulations with forward looking assumptions and should not be construed to be indicative of actual events that will occur. There is no assurance that the performance presented will be achieved.

expected to be larger and the consequent adverse currency move required to offset those benefits would also increase commensurately.

We can conclude from this analysis that investors should be suitably compensated in the form of “illiquidity premium” for the additional currency risk they must bear in order to allocate to illiquid assets, provided they have a sufficiently long time horizon (typically 10+ years). Therefore, we aim to maximise a portfolio’s allocation to illiquid assets to deliver the highest returns, within other constraints on the portfolio, but independent of currency constraints. Thereafter, investors should hedge as much of the portfolio as possible towards the “ideal” hedge ratio without compromising their asset allocation.

Appendix D: View on Diversification Benefits of Foreign Currency

Although currency pairs exhibit volatility (e.g., USD/GBP has historic annual volatility of c.9%)⁴, some currency pairs are correlated to equity markets. We therefore observe an effect whereby an investor seeking to minimise volatility would partially hedge their portfolio, resulting in the characteristic “volatility smile” observed in Exhibit 8. Whilst some may be familiar with this graph, we would note that the reduction in volatility is relatively modest,

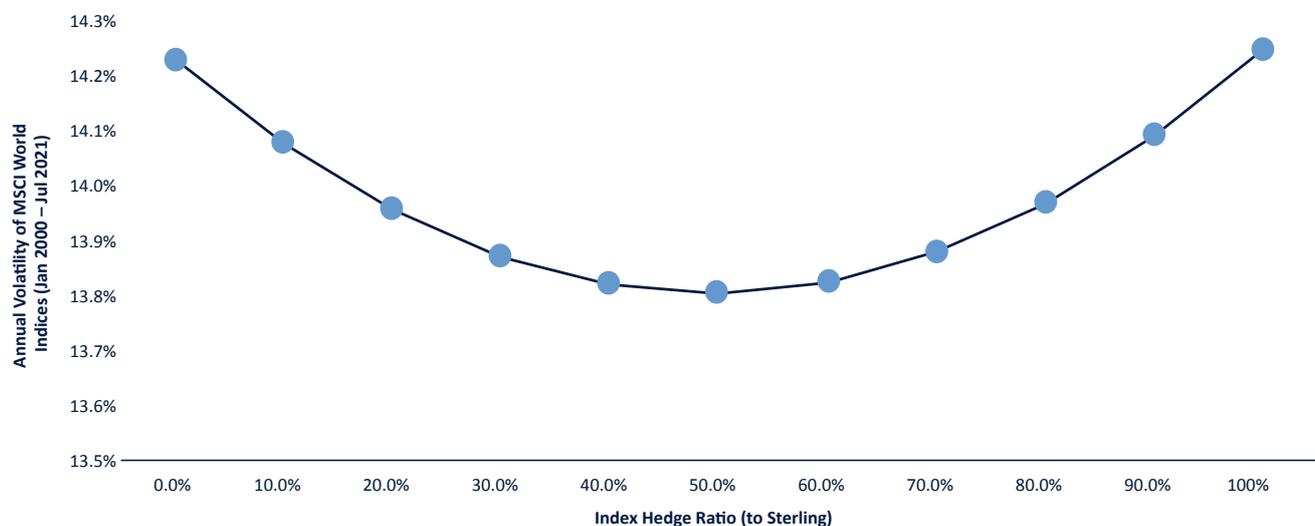
⁴ Source: Bloomberg

with the lowest volatility level being c.13.8% versus c.14.2% volatility for the unhedged index. The point at which volatility is minimised is also highly dependent on the home currency, the mix of asset classes and the period of analysis. For instance, hedging Japanese equity investments back to US Dollars has historically increased the volatility of returns for US Dollar investors, as the Yen has exhibited a negative correlation with Japanese equities.

We believe the diversification considerations of unhedged currency are most important for a Sterling investor in times of market stress (i.e., over shorter periods), largely due to exposure to “safety net” currencies (Dollar, Yen, Swiss Franc). Exhibit 9 shows that during periods of market stress these currencies generally strengthen, except in the event where that currency’s base country is the source of the market shock, (e.g., US Dollars in 2000 during the US-centric tech crisis).

On the other hand, a high allocation to “safety net” currencies in preference to a “risk-on” currency such as Sterling may also lead to periods where the hedging level significantly deviates from the target, particularly if the higher equity risk areas of the portfolio are more predominately denominated in those “safety net” currencies (e.g., Private Equity assets largely denominated in US Dollars, and bond allocations largely denominated in Sterling). This is because hedge contracts are fixed in nature, while

Exhibit 8: The volatility of equities exhibits a classic “volatility smile” at different hedging levels



Source: MSCI, Bloomberg, Partners Capital calculations.

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A Practical Guide to Hedging Foreign Currency Exposure in Endowment Portfolios

Exhibit 9: “Safety net” currencies show some signs of protection vs. Sterling during market stress

Economic Event	Start Date	End Date	Global Equities	Dollar vs. GBP	Euro vs. GBP	Yen vs. GBP	Swiss Franc vs. GBP
Reagan/Volcker Rate Hikes	Aug-81	Jul-82	-9.7%	6.2%	–	-5.2%	8.3%
Black Monday	Sep-87	Nov-87	-24.0%	-11.0%	–	-1.5%	1.4%
1990 Oil Shock	Jan-90	Sep-90	-23.7%	-10.7%	–	-6.6%	3.4%
9/11 Terror Attack	Sep-01	Sep-01	-8.9%	-1.4%	-1.1%	-1.4%	1.7%
Dot Com Tech Bubble	Sep-00	Mar-03	-43.0%	-6.6%	15.6%	-14.3%	19.4%
Global Financial Crisis	Nov-07	Feb-09	-48.6%	43.6%	23.9%	63.4%	38.5%
Greek Debt Crisis	Mar-11	Sep-11	-15.4%	3.1%	-2.7%	10.8%	4.0%
First COVID-19 Crisis	Jan-20	Mar-20	-19.9%	6.5%	5.3%	7.1%	6.2%
Straight Line Average			-21.5%	3.2%	8.2%	6.0%	9.6%
Median			-19.9%	-1.3%	5.3%	-1.4%	4.0%

Source: MSCI, Bloomberg, Partners Capital calculations.

the portfolio value fluctuates daily. The attempt to dynamically hedge a portfolio as asset prices fluctuate in real-time is commonly referred to as “delta hedging”, and the impossibility of accurately delta hedging a portfolio of infrequently-priced assets can lead to a drag on returns. This is true particularly for investors whose base currency is “risk-on” (e.g., Sterling, Australian Dollar, Canadian Dollar), as the extent of their over-or under-hedging correlates with the performance of their overall portfolio.

Appendix E: View on the “Cost” of Hedging Foreign Currency

There are several costs – both direct and indirect – associated with running a currency hedging programme.

Direct Costs

The implementation of a currency hedging programme via derivatives with suitable counterparties typically attracts c.0.04% (of the notional value of the hedge) in annual direct costs in order to monitor, calculate and assist in the execution of currency hedging contracts. This can be either paid to the investment manager (i.e. Partners Capital) or a specialised third-party

provider. We view this cost as small relative to the reduction in risk that can be achieved through a well-implemented currency hedging programme, although we would recommend investors reassess the suitability of a currency hedging programme should those costs increase.

Interest Rate Differential

Where two currencies have divergent interest rates, the rate at which one can buy or sell those currencies forward will be different from the prevailing spot rate. This reflects the economic reality that an investor can only access the risk-free rate in their own currency, because, at a basic level, investors hold an asset to earn the risk premium offered by that asset over the risk-free rate. For example, buying a US corporate bond provides an investor with the US sovereign (“US risk-free”) rate plus a credit spread. By currency hedging, an investor can fully capture the credit spread of the asset over the risk-free rate but will earn only their local sovereign rate.

Some investors view it as misleading to describe this effect as a “cost”, as it simply represents an economic fact. Those who believe that the difference in interest rates between two currencies should be the central expectation for the relative change in their exchange rates over the same period may be

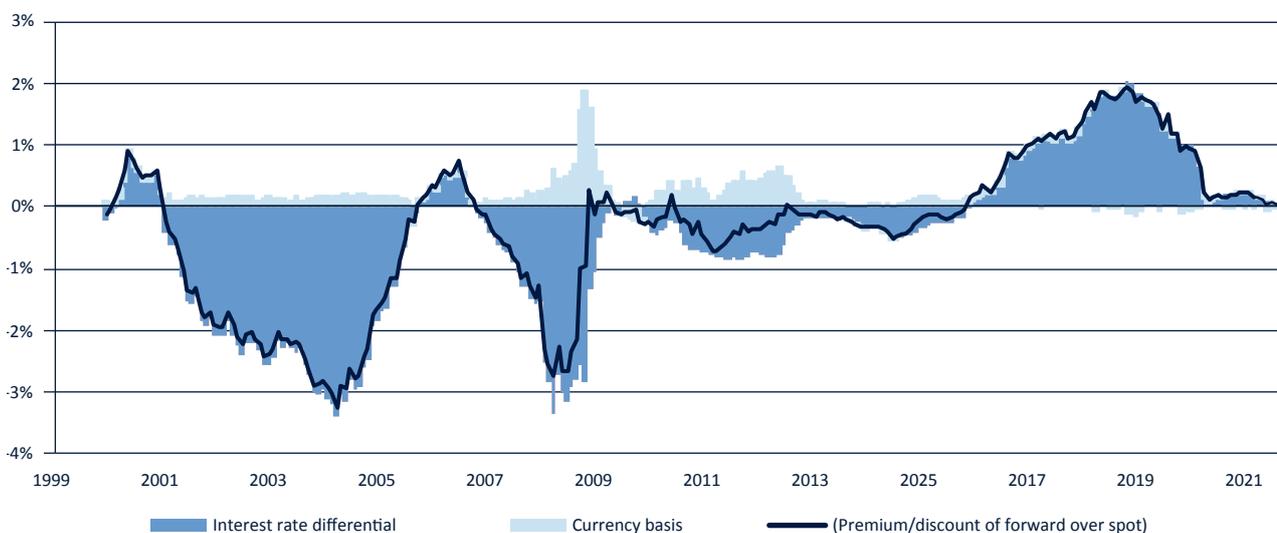
more willing to remain fully hedged regardless of interest rate differentials, whilst those who do not subscribe to this weaker form of uncovered interest rate parity may be less willing to remain fully hedged in all scenarios.

For example, if the 12-month forward US Dollar interest rate is 4.5% and the 12-month forward Sterling rate is 0.5%, an investor may be happy to bear the 4% “cost” of entering into a currency forward contract as their central expectation is that the US Dollar will depreciate by 4% in the next 12 months. In their eyes, you would be paying a “fair price” for hedging foreign currency exposure, and removing large left-tail currency risks. Although evidence suggests that uncovered interest rate parity does not hold in practice, we do not believe that a superior alternative exists for forecasting future currency movements. We therefore advise investors to maintain hedges at their target level regardless of the “cost” to do so in the form of interest rate differential.

Basis

Cross-currency basis occurs when supply and demand imbalances move forward discounts or premia away from that implied by covered interest rate parity (covered interest rate parity is the theory that the interest rates, spot and forward currency values of two countries are in arbitrage-

Exhibit 10: During “normal” market conditions, interest rate differential explains the majority of forward premium/discount



Source: Bloomberg, Partners Capital calculations.

free equilibrium). Basis can be positive or negative depending on the prevailing supply/demand environment of the currency being hedged. Unlike the interest rate differential, which we tend to see as the price that any investor must pay to invest in another country's assets with no currency risk, the basis is a pure cost (or benefit) driven by being on the wrong (or right) side of supply and demand factors. In normal times, the basis is very small for liquid contracts and increases marginally for contracts of greater than 12 months' maturity). However, in stressed times such as during the Financial Crisis of 2008, basis can be a meaningful portion of the overall cost. In these times we would encourage more cost-sensitive investors to adjust their positioning within their target range.

Appendix F: Portfolio Asset Currency Exposure

If we consider a continuum of asset types according to risk, with money-market instruments at the least risky end and equities at the riskiest end, the currency exposure of the asset becomes increasingly difficult to determine as we move along that continuum. A low-risk fixed-income instrument embodies a right to a fixed payment in a fixed currency at a fixed point in time. For a so-called "risk-free" investment, the only risk borne by an investor would be currency risk if the denomination of the instrument differed from the investor's home currency. It is therefore uncontroversial to say that such an instrument has 100% local currency exposure. As we move to the riskier end of the continuum, it becomes more difficult to precisely determine the currency exposure of an individual security. A share does not confer the right to any fixed payments, and its value is determined by the present value of a company's cashflows. For a large multinational company, those cashflows may embed multiple currency risks regardless of the country of domicile. An extreme example of this effect occurred shortly after the announcement of the outcome of the Brexit vote in 2016, when the FTSE 100 rallied significantly on the anticipated benefit of higher reported Sterling earnings from the impact of translating non-Sterling profits into Sterling at a favourable exchange rate.

According to Capital IQ, 87% of companies in the S&P 500 report a breakdown of geographic revenue. Of those with available data, 71% reported revenues coming from the US. However, this declines significantly when looking at operating income or net income. Meanwhile, Chatham Financial estimates that approximately 50% of publicly listed US companies hedge foreign currency risk. As such, it is virtually impossible to precisely assess the currency exposure of equity investments.

At Partners Capital, our equities portfolios are geographically diversified and so we expect a meaningful level of "netting off" of profits in non-listing currencies (e.g., the Yen exposure of a US company is netted by the US Dollar exposure of a Japanese company). Meanwhile, we must remember that multinational companies seek to maximise total shareholder return in their listing currency, and so we ultimately conclude that the listing currency is the best and most practicable framework for determining the currency exposure of an equity.

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