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Going global with bonds: Considerations for UK investors

Vanguard research

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With UK bonds making up just a small fraction of the global fixed income marketplace, taking a global approach to fixed income investing allows investors to drastically expand their investment opportunity set. The theoretical diversification benefits of adding more markets and issuers to a portfolio are clear, yet currency risk presents a particular challenge in a fixed income investment. In this brief we examine global fixed income as an asset class, addressing potential diversification benefits, risks, and hurdles to achieving this exposure, with a specific focus on the role of currency and the trade-offs involved in maintaining some amount of 'home bias'. We conclude that, with currency risk hedged, global bonds represent an attractive investment that can provide significant risk reduction and diversification benefits in balanced portfolios.

Authors
Peter Westaway, PhD
Charles Thomas, CFA

Why not go global?

Global bonds allow an investor to achieve exposure to the interest rate profile, inflation and economic cycles, and political climate of a wide range of markets outside of the United Kingdom within their fixed income allocation.^{1,2} Relative to a more UK-focused bond investment, some of these 'global risk factors' might, at first glance, seem likely to add to the risk. After all, many would argue that the UK is a reasonably stable, wealthy, developed economy and therefore likely to provide quite a 'safe' fixed income investment.

But investors should keep in mind that, to the extent that the events influencing the bond markets of other countries are different from those in the UK, a global allocation may have the ability to reduce the risk of an investor's fixed income portfolio, without necessarily decreasing expected return.³ Even though the bonds of any one issuer may be more volatile than comparable bonds in the UK, an investment that includes the bonds of all countries and issuers would benefit from any imperfect correlations across those issuers. In other words, rather than focus on each asset in isolation, we need to consider the interactions between assets in a portfolio setting. So even if individual markets appear volatile, if global bonds 'zig' when the UK market 'zags', the end result may be to smooth out the combined returns over time, reducing total portfolio volatility.⁴

What matters for bond returns?

The level and movement of interest rates within a country or currency area is the main driver of its market's bond returns over time. In most developed markets, short-term interest rates are influenced by central bank policy and will fluctuate over time according to policymakers' views on medium-term inflation and economic growth. Longer-term interest rates can be considered the average of expected future short rates, plus a term premium for bearing maturity risk. As such, long-term rates are set by market participants buying and selling bonds based on expectations for future central bank policy, driven by expectations for economic growth and inflation, plus time-varying risk premia driven by investors' willingness to bear maturity and inflation risk.⁵ Sovereign and credit risk premia may also cause variability in bond returns, depending on the country and sector being examined.

If these drivers of returns are sufficiently different across markets, exposure to global bonds has the potential to offer significant long-term diversification benefits. In **Figure 1**, we show evidence of this diversification effect: the interest rate movements within of a group of the 12 largest government bond markets are less than perfectly correlated with UK interest rates.

1 This paper expands upon previous Vanguard research (Philips, et al., 2012b) on a global fixed income allocation from a UK investor's perspective. For similar research from a US investor's perspective, see Philips, et al. (2012a).

2 Throughout this paper, we use the term 'global fixed income' to refer to the universe of investment grade fixed income securities available for purchase by international investors, issued in a liquid, hedge-able currency. We use the term 'UK fixed income' to refer to the universe of investment grade bonds issued in Sterling (84% of which is issued by entities domiciled in the UK, as of 31 December 2012). See the appendix for specific index definitions.

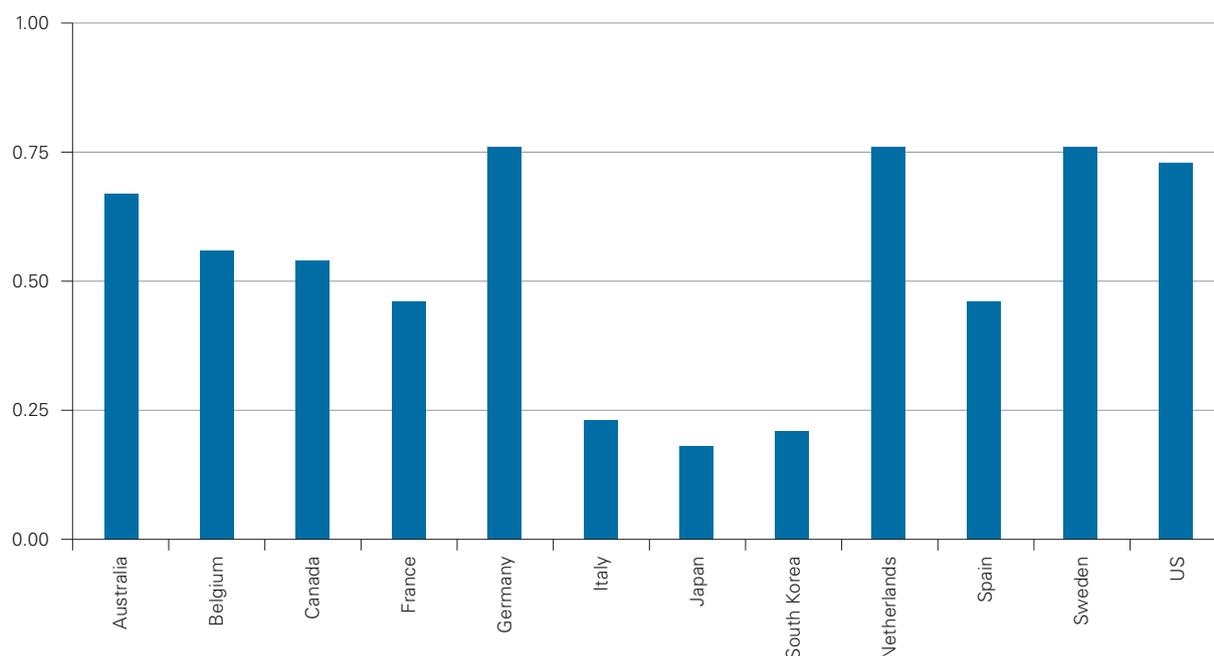
3 Put in more technical terms, expanding one's investment opportunity set can result in an upward shift to the efficient frontier, allowing one to achieve better risk-adjusted return outcomes.

4 Throughout this paper, we discuss global bonds in the context of an investor that pursues a total return objective. For a discussion in the context of liability-matching, including annuitisation, see page 15.

5 More recently, some central banks have gone beyond traditional short-term interest rate targeting, and also purchased longer-dated government bonds. We feel the above statement still applies, as the majority of yield movement is driven by market participants—the direct impact of central bank purchases is relatively small. For example, Hamilton and Wu (2011) find that purchases of longer-term US Treasuries by the Federal Reserve totalling \$400 billion would lower the 10-year treasury yield by 0.13%.

Figure 1. Interest rate profiles across countries suggest diversification benefit

Correlation of the monthly change in each country's 10-year government bond yield to that of the UK, Jan 1998–Sept 2012



Notes: Shows the correlation of the monthly change in the yield of each country's 10-year government bond to the change in the 10-year UK gilt yield.
Source: Vanguard, based on data from Thomson Reuters Datastream.

Currency and global investing

Of course, investing outside of one's domestic market will entail owning bonds that pay interest and principal in other currencies, adding a wrinkle to the diversification benefit that might otherwise be expected. Not only can currency add volatility beyond that of the underlying fixed income investment, but the investment merits of currency are generally not as straightforward as those of other asset classes: currency itself does not generate any future cash flow, so its performance is entirely driven by changes in its relative value. Investors have the option of hedging away currency risk, through the use of forward contracts, but this adds cost and complexity to the investment process, and assumes that currency adds no value in a portfolio setting. So we ask the question: to hedge or not to hedge?

This is an important question, because currency movement is responsible for the majority of the volatility in a market-weighted un-hedged global bond investment.⁶ In **Figure 2a**, the strong inverse relationship between global bond returns and the movement of the pound sterling is clearly evident – when the pound depreciates, the foreign currency

exposure of global bonds provides positive returns, and vice versa. Indeed, currency has explained 84% of the monthly variance in returns of a global bond allocation since 1985. Returns have been consistently more volatile throughout time than either UK bonds or hedged global bonds, approaching equity-like volatility levels in some periods (see **Figure 2b**). On average, currency has made un-hedged bonds about 1.5 times as volatile as an investment in UK bonds and nearly 2.5 times as volatile as the underlying global bonds with currency exposure hedged away.

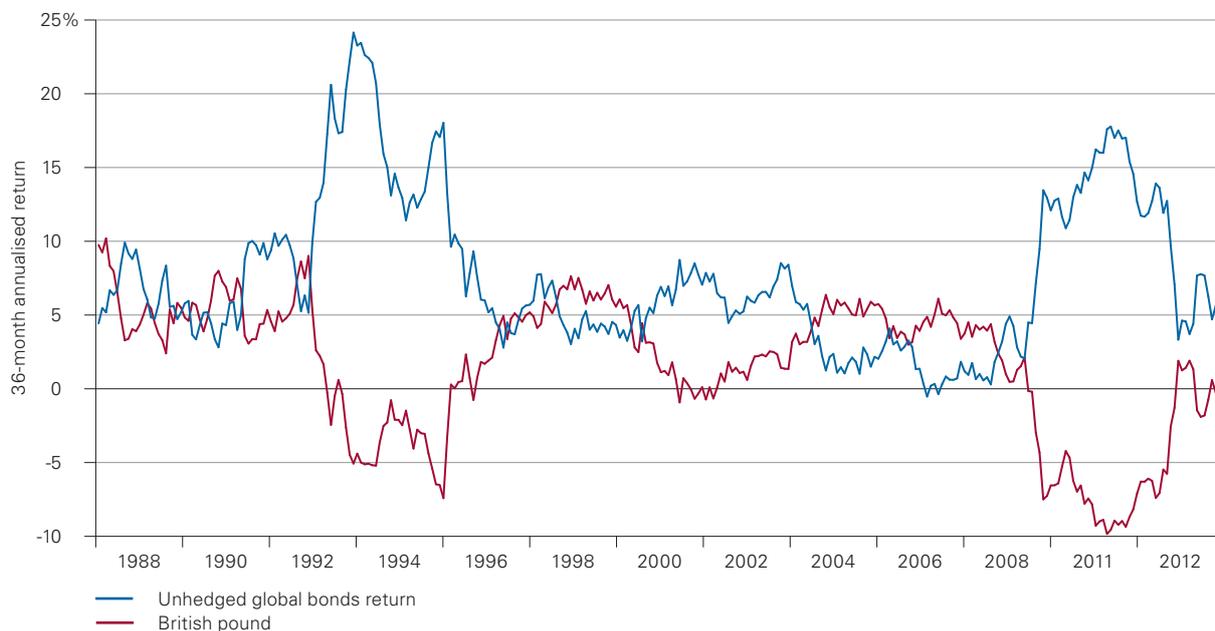
These historical results are consistent with the findings of academic researchers that have suggested short-term currency movement follows a random walk (Meese and Rogoff, 1983), representing a source of uncompensated risk (Perold and Schulman, 1988).⁷ This would suggest that, by itself, an investment in foreign currency provides little value to investors, only adding volatility. However, even with an expectation of zero return and positive volatility, currency might make sense in a portfolio context if it moves against other risky assets.

⁶ Throughout this paper, we use market-weighted benchmarks, as defined in the appendix to represent various asset classes. See Thomas and Bennyhoff (2011) for a discussion of the merits of market capitalisation versus alternative weighting methods.

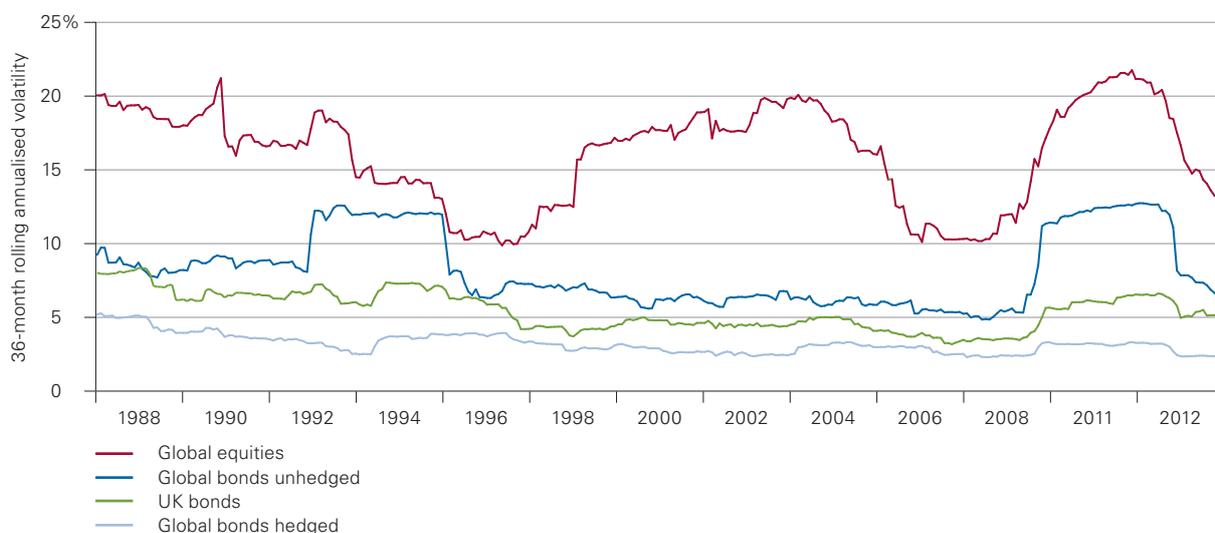
⁷ "Random walk" indicates that an asset's returns follow a random, unpredictable path through time, while "uncompensated risk" indicates that an investor would not expect to earn a positive return from an asset over the long-term. Based on this research, one could consider currency an asset with zero long-term expected return, yet positive volatility.

Figure 2. Currency volatility drives the returns of global bonds

a. Rolling 36-month returns of global bonds and currency



b. 36-month rolling volatility of monthly returns



	Global equities	UK bonds	Global bonds un-hedged	Global bonds hedged
Avg. volatility 1985-2012	16.2%	5.7%	8.5%	3.5%

Notes: Data covers Jan.1985 through Dec.2012. British pound return in Figure A is the inverse of the currency return from translating the of the Barclays Global Aggregate back to pounds.

Sources: Vanguard, based on data described in the appendix.

Currency in a portfolio setting

While the foreign currency exposure of global bonds has resulted in much higher volatility than a UK or hedged global bond allocation, we have to consider the impact of currency correlation when it is placed in a portfolio. We first examine the impact of un-hedged bonds within a risk minimisation framework.⁸ This framework implicitly assumes that investors are indifferent to the potential long-run return differential between owning currency and hedging it away, a point to which we will return later.

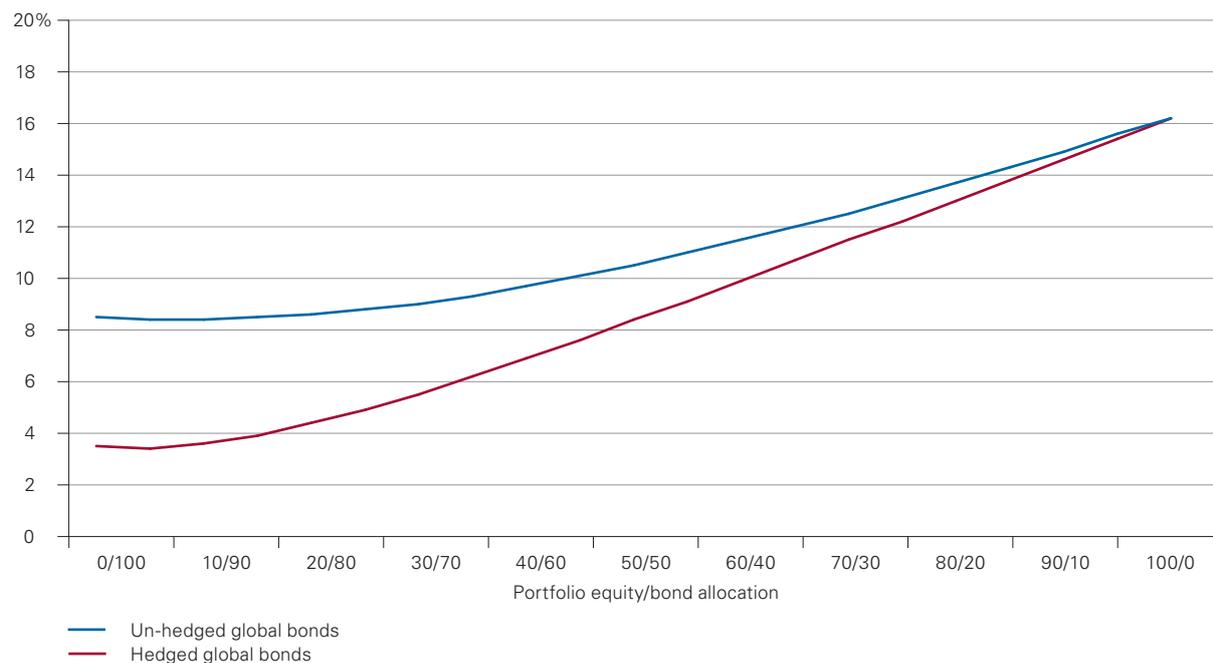
In **Figure 3**, we show historical volatility since 1985 for a range of global balanced portfolios, of varying asset allocations, rebalanced monthly. The portfolios

are invested according to the stated allocation in a combination of un-hedged global equity and either un-hedged or hedged global bonds for the fixed income allocation. The results show that, no matter the stock/bond asset allocation, hedged bonds provided superior risk reduction and diversification benefits.

Importantly, the risk reduction benefits in **Figure 3** have been more pronounced for portfolios with higher fixed income allocations. For the more conservative investors that would typically have this type of asset allocation, the volatility reduction is meaningful: a 20/80 portfolio invested in hedged global bonds had volatility about half that of a portfolio with un-hedged bonds.

Figure 3. Hedging currency exposure provides superior diversification benefit

Annualised volatility of balanced global equity/global bond portfolios, with either hedged or un-hedged global bonds, Jan 1985 – Dec 2012



Notes: Displays the annualised volatility of monthly returns of portfolios formed with various global stock/global bond allocations, with the global fixed income allocation either hedged back to pounds or un-hedged including the impact of translation back to pounds.

Sources: Vanguard, based on the data described in the appendix.

⁸ See LaBarge (2010) for a discussion of currency risk management in a global equity portfolio

We can conclude that hedging away the movement of the pound allows the properties of the underlying bonds to play the traditional fixed income role of risk reduction. The imperfect correlation of foreign currency with the other stock and bond assets is not enough to mitigate the effects of its higher volatility.⁹ In addition, many investors may already have currency exposure in their global equity allocation, meaning that the currency exposure of un-hedged bonds isn't adding anything that a balanced investor doesn't already have.^{10,11}

The trade-offs of currency hedging

As with every decision in investing, the choice to hedge a portfolio has trade-offs. While it lowers volatility and provides superior diversification, hedging global bonds requires an additional set of transactions that add cost to the portfolio.¹² Currency forwards can be used to buy and sell currency at a forward date, eliminating currency volatility from the portfolio.¹² The prices of these contracts tend to follow a no-arbitrage relationship according to short-term interest rate differentials across markets. This means that the return an investor earns when hedging a global bond investment will be impacted by their home currency short rate environment, relative to that of the rest of the world.

Although the actual impact will differ based on the size of the portfolio and specifics of the hedging programme, in **Figure 4** we show a historical estimate of the rolling annual transaction costs associated with the forward contracts that would be used to hedge various currencies back to the pound sterling. These five currencies currently comprise 95% of the global bond market excluding GBP exposure (we exclude the GBP exposure, as it would not need to be hedged).

While liquidity varies across currencies, the estimated transaction cost of hedging based on current weights in the global bond market amounted to roughly 4 basis points (0.04%) annualised in 2012. While market disruptions can cause spikes in transaction costs over time (as was seen in 2008 and 2009), the weighted average cost has been less than 0.1% for the past decade and has averaged 0.03% annualised. Given the average total expense ratio of active global bond funds available for sale in the UK of 1.3%¹³, this does not seem like a significant hurdle to overcome, especially given the volatility reduction achieved relative to remaining un-hedged.

When examining a currency hedging programme, it is important to keep in mind that currency forwards will be impacted by market disruptions related to liquidity and counter-party risk. Currency forwards tend to reflect short-term interbank interest rates, and so include time-varying risk premia relative to short-term government bill rates. This can cause deviations in the price of the forward contract relative to what would be implied by short-term 'risk free' rates, especially during periods of market stress. However, even in 2008–2009, the volatility caused by these shifts was significantly less than the volatility of leaving the currency exposure un-hedged.

9 The results in Figure 3 are not impacted by the choice to over-weight the UK market in either the equity or fixed income portfolio. Hedged global fixed income still produced a portfolio with lower volatility than when using un-hedged global bonds, across all stock/bond asset allocations.

10 Although the differences in volatility are less pronounced, the implications of Figure 3 are not impacted if we use a hedged global equity allocation. A hedged global bond allocation still provided lower or equal overall portfolio volatility relative to using un-hedged global fixed income.

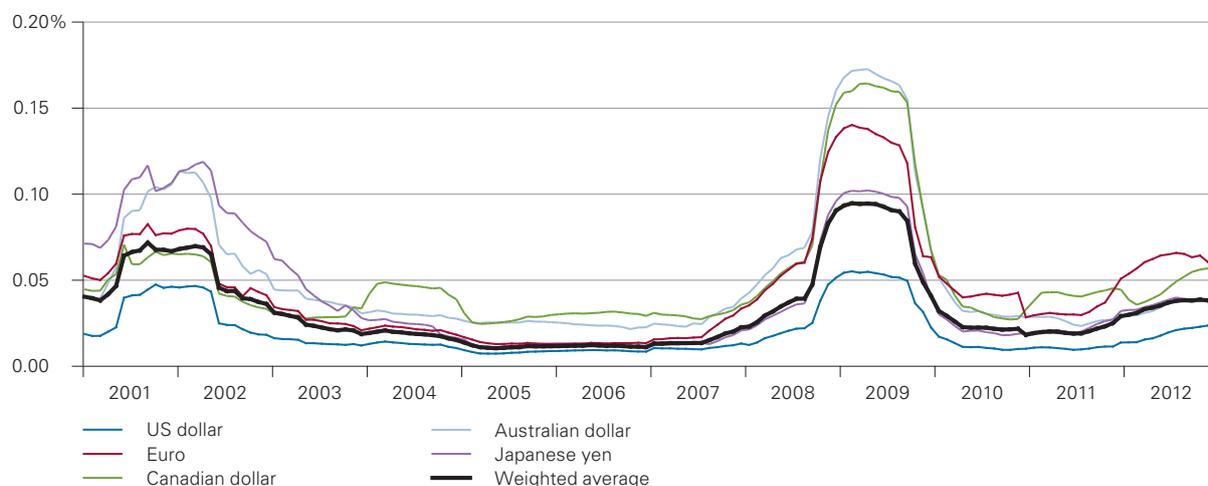
11 If we allow the currency exposure of a balanced portfolio to vary independently of the allocation to global bonds (in other words, treat currency as a separate asset class), it is quite possible that some allocation to currency will provide risk reduction benefits, depending on the specific stock/bond asset allocation of the portfolio. In this analysis, we focus on global bonds, treating the hedging decision as binary (not allowing partial hedging), and so consider the topic of 'ideal currency exposure' to be beyond the scope of this paper.

12 We should note that, in practice, a hedging programme will rarely achieve this result perfectly. To perfectly hedge a portfolio over a given time period, one must know with certainty the ending asset value. To the extent that the underlying securities change in value over the hedging horizon, a hedging programme will result in some amount of un-hedged (or over-hedged) risk exposure.

13 Source: Morningstar, Inc as at 31 December 2012.

Figure 4. Hedging currency can add transaction costs

Rolling 12-month average annualised bid/offer spread for 1-month forward contracts relative to the pound sterling, Jan 2001–Dec 2012



Notes: Figure displays the bid/offer spread, calculated as one-half of the spread between the bid and offer quotes of forward rate points, as an annualised percentage of the midpoint spot rate. Each currency is assumed to first be hedged to the US dollar and then to the pound, reflecting common portfolio management techniques. The weighted average is based on the historical market weights of each currency in the Barclays Global Aggregate index. The 5 currencies shown have ranged between 94.5% and 98.1% of the ex-GBP market value of the index since 2001.

Source: Vanguard, based on data from Bloomberg and Barclays.

Of course, a trade-off that many investors may consider to be more important than the modest transaction costs of hedging is the prospect of foregone return from currency. We should note that this cuts both ways: while hedging does reduce the upside return from foreign currency appreciation, it also limits the downside. As we previously stated, most academic research finds short-term currency movement at best very difficult to forecast correctly, with many researchers treating it as a random walk. While short-term movement inherently requires skill in market-timing and therefore is likely difficult to consistently benefit from, we address the issue of long-term currency return in the following section.

The impact of long-run currency return

Our analysis has shown that a hedged global bond investment makes sense for UK investors, from a risk-minimisation perspective, relative to un-hedged global bonds. However, this has ignored the possibility of long-run return from a foreign currency investment. To address this

issue, we ask the question: how much foreign currency appreciation is needed before un-hedged bonds start to become attractive in a long-term strategic portfolio?

It's important to first frame this question and account for the amount of foreign currency return that an investor realises through hedging their portfolio back to sterling. To the extent that a trend in currency return is driven by slow-moving macroeconomic factors such as trade flows and inflation differentials, market participants should price yields across countries to offset this expected currency movement.¹⁴ For example, if the UK is expected to have a higher future rate of inflation than the US, market participants would generally sell UK bonds to purchase US bonds, driving up interest rates in the UK, relative to the US. This higher rate of inflation in the UK would also be expected, in the long run, to create downward pressure on the pound exchange rate relative to the dollar.¹⁵ The relationship expressed here generally holds across markets in the long run,

14 This is known as uncovered interest rate parity, the theory that currency should move to off-set differences in yields, making an investor indifferent between owning a risk-free bond in their home country and a risk-free bond in foreign currency. There is evidence that this theory holds at longer investment horizons (see Meredith and Chinn, 1998; and, Mark, 1995).

15 This is consistent with the theory of purchasing power parity, which states that similar goods across markets should be sold at the same price. This indicates that a market with a higher average inflation rate would generally have a depreciating currency, to offset the faster increase in local prices.

although exchange rate movements exhibit significant volatility in the short run. Since the prices of currency forwards reflect interest rate levels across countries, the forward premium that is earned through hedging should reflect to some extent the long run expected currency return, and eliminate the more volatile unexpected portion.^{16,17} So a question that is more to the point: how much unexpected foreign currency appreciation is needed to justify a strategic allocation to un-hedged global bonds?

To answer this, we form a rough forward-looking efficient frontier to evaluate the trade-offs between risk and return in a portfolio setting.¹⁸ As risk inputs to this analysis, we take the historical volatilities and correlations between global stocks, un-hedged global bonds, and hedged global bonds (based on the data and time periods listed in the appendix). The current yield of the global bond market and the historical return for equities can be used to approximate forward-looking mean returns.¹⁹ Using these inputs, we generate the full range of efficient portfolios and then evaluate what amount of foreign currency appreciation, beyond the 'expected' movement which might be captured in the forward premium through hedging, is needed for un-hedged bonds to become a viable investment. We begin with the assumption that both hedged and un-hedged global bonds generate the same long-run return (in other words, unexpected currency return is 0% and currency return equals the forward premium over the long-run). We then test the viability of un-hedged bonds by successively adding an assumed 'unexpected' currency return and examining whether un-hedged bonds appear on the frontier in any meaningful allocation.

Figure 5 displays the results around the particular range of assumed foreign currency appreciation where un-hedged bonds begin to appear as a viable investment. We find that, until one assumes greater than 1.5% average annual unexpected currency return (that is: greater than 1.5% average annual foreign currency appreciation beyond that which is realised through hedging), un-hedged bonds do not appear to be an efficient asset class. For fixed income oriented investors, hedged bonds remain the more viable option under all of the currency scenarios we examined, with un-hedged bonds appearing only in modest allocations under any assumed unexpected currency return. It takes very aggressive assumptions regarding unexpected pound depreciation (greater than 25% over a 10-year horizon) for un-hedged bonds to become a viable long-term investment under our framework, and even then only for more equity oriented investors.

16 The forward premium is the difference in price between a currency's forward and spot exchange rates and can be considered a measure of expected currency return. Selling a currency forward (to hedge an investment) may generate either a positive or negative return relative to the current spot rate, meaning that expected currency returns can be negative, depending on the investor's perspective. However, a negative forward premium (perhaps due to a lower domestic inflation rate) should not impact the hedging decision. Expectations are reflected in both a hedged and un-hedged investment, meaning the net effect of hedging is merely to remove the more volatile unexpected portion of the currency return.

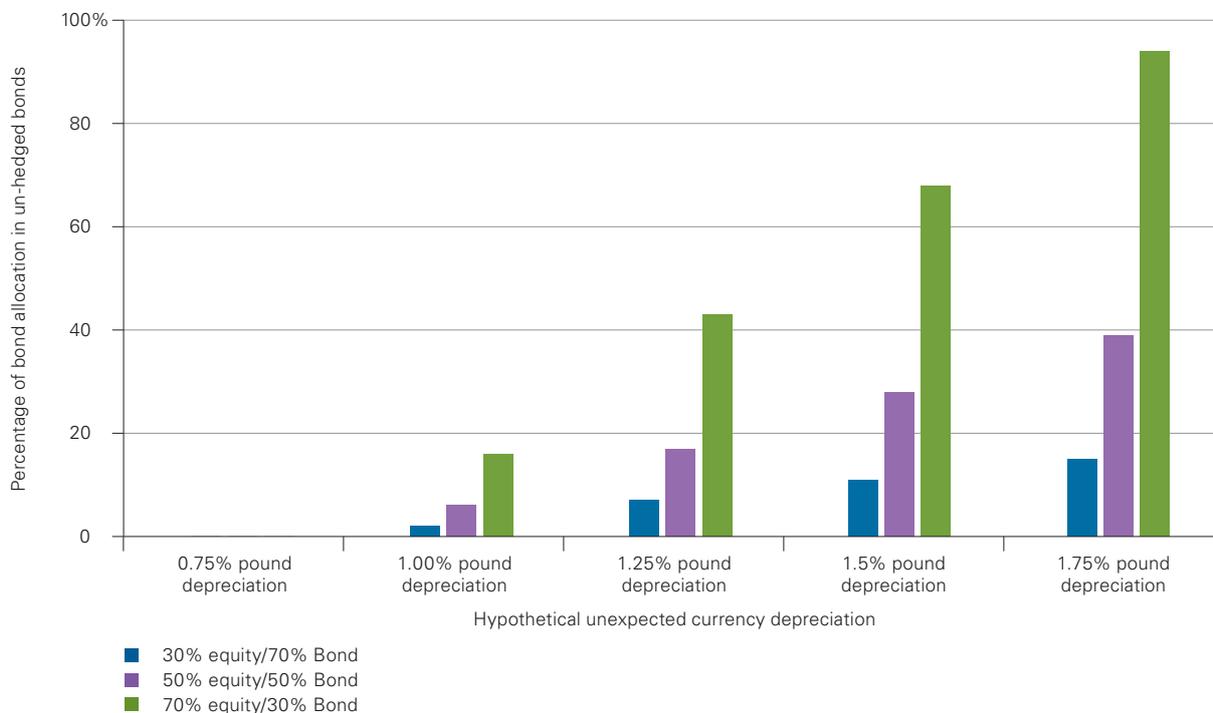
17 In reality, since currency hedging is typically implemented at short horizons, the 'expected' currency return captured through hedging reflects differences in short-term interest rates, which have been found to be poor (even biased) predictors of currency movement over short horizons (Hodrick, 1987; Engel, 1995). Our interpretation is that, given the findings on long-run predictability in Footnote 14, the average difference in short-term rates over a typical (longer term) investment horizon should reflect factors, such as inflation levels across countries, that would drive currency movement.

18 An efficient frontier is the set of portfolios that combines the available assets to produce the lowest volatility portfolio for a given level of return.

19 As of December 2012, the yield on the Barclays Global Aggregate was 1.7% and the historical return from Jan. 1985 through Dec. 2012 on the spliced global stock index in the appendix was 8.5%. Our simple mean return assumptions are certainly subject to criticism, however for the specific purpose of evaluating the trade-offs between hedged and un-hedged bonds, we feel the levels of returns are not as important. We are mainly concerned with the relative returns between un-hedged and hedged global bonds that would make up for the volatility impact of currency.

Figure 5. Significant long-term unexpected GBP depreciation is needed to make un-hedged bonds a viable strategic investment

Optimal allocation to unhedged global bonds under various currency return scenarios



Notes: Figure displays the proportion of the global bond allocation that is allocated to un-hedged bonds versus hedged bonds under several assumptions on long-term foreign currency return, based on the results from a portfolio optimisation using the inputs described on page 9.

Sources: Vanguard, based on the data described in the appendix.

To put our assumptions in **Figure 5** into context, we note that an un-hedged global bond investment since 2000 has realised a return due to foreign currency appreciation that has averaged 0.9% per year (meaning that the pound has depreciated over this period). Over this same time period, the return an investor would have realised from hedging this investment was 1.4% per year on average (adjusting for the upper range of transaction costs of hedging from **Figure 4** brings this to roughly 1.3% per year). In other words, the ‘unexpected’ currency return was -0.5% per year (-0.4% after hedging costs), due to the pound not depreciating quite as much as the forward market had been pricing. This value of -0.5% average unexpected currency return is off the scale (to the left) in **Figure 5**. While this result will certainly change as short-term interest rates and exchange rates move over time, it demonstrates the importance of accounting for the implicit expected currency return an investor receives when hedging.

Global versus local

We have thus far demonstrated that the currency volatility present in un-hedged global bonds detracts from the underlying bonds ability to provide diversification and risk reduction in a broader portfolio, unless aggressive assumptions are made about long-term currency return. As such, investors considering a global bond allocation should consider hedged bonds as a more appropriate fixed income investment. However, many UK investors may be inclined to just invest in their own domestic bond market, perhaps to avoid the perceived complexity of a global allocation or the transaction costs associated with hedging. Indeed, in 2010, the average UK fixed income investor had 57% of their portfolio invested in UK bonds, implying a 51 percentage point ‘over-weight’ beyond the 6% that the UK represents in the global bond market.²⁰ We discuss the issues particular to ‘home bias’ in this section.²¹

20 See Philips et al (2012b) based on data from the IMF Coordinated Portfolio Investment Survey.

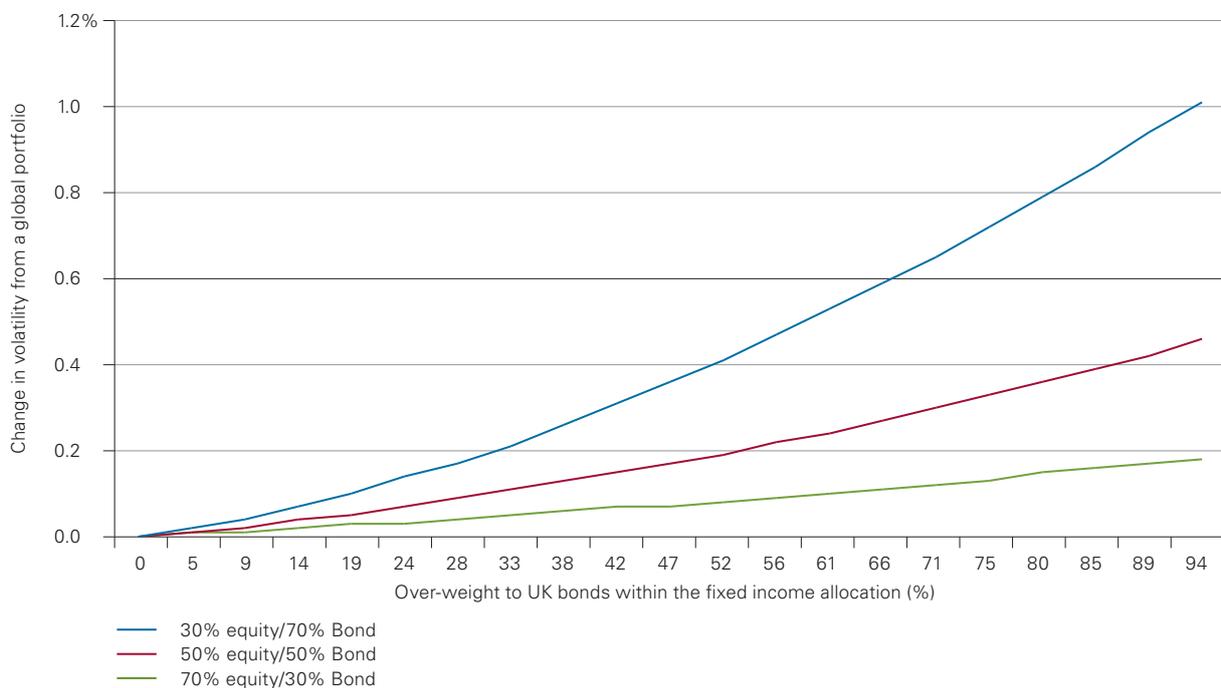
21 Also see Philips et al (2012b) for a discussion.

At the extreme, an investor owning only UK bonds is ignoring 94% of the investment-grade fixed income securities in the world, and owns a portfolio that is highly concentrated in the risk factors of a single market.²² We showed in **Figure 2** that UK bonds have been historically more volatile than a hedged global allocation. In a portfolio context, the low correlation of the UK bond market to the global equity market has offered no benefit over a hedged

global bond allocation, as demonstrated in **Figure 6**. Starting from a balanced portfolio of global stocks and hedged global bonds, adding extra weight to UK fixed income would have increased overall portfolio risk, no matter the particular stock-bond allocation.²³ This effect was particularly pronounced for the more fixed income oriented portfolio, where volatility increased 100bps when moving from a global to 100% UK bond allocation.

Figure 6. There has been no volatility reduction from over-weighting UK fixed income

Volatility change from adding UK bonds to the fixed income portion of a global equity/global hedged bond portfolio, Jan 1985 – Dec 2012



Notes: Displays the historical change in volatility from a global stock/bond allocation that results from over-weighting the UK bond market within the fixed income allocation.

Sources: Vanguard, based on the data described in the appendix.

If average volatility is not a factor justifying an over-weight to UK bonds, perhaps diversification during particular periods of market stress is playing a role? In **Figure 7**, when we examine the worst 10% of monthly equity returns in the global equity market, we find that hedged global bonds have provided better median outcomes as well as a

much tighter distribution of returns, meaning more consistency for investors during poor equity market returns.²⁴ The traditional role of fixed income is to buffer a portfolio from short-term equity market declines and a global hedged bond investment has provided superior results on this front.

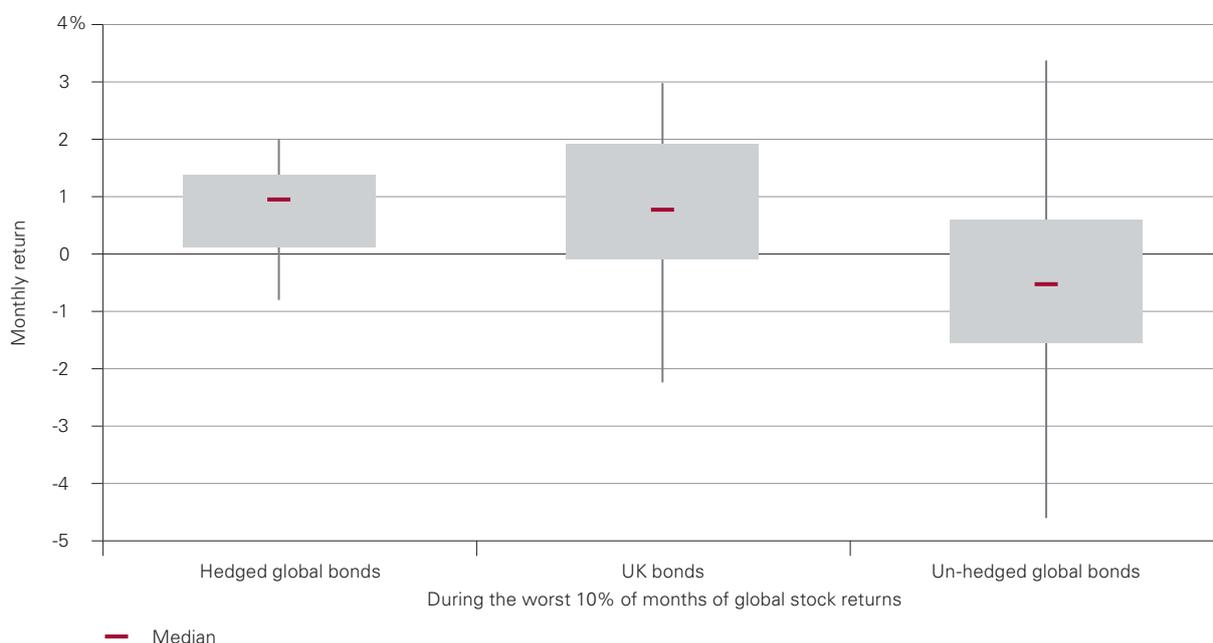
²² The market value of the Barclays Sterling Aggregate was 6.1% of the Barclays Global Aggregate as of 31 December, 2012.

²³ The implications of Figure 6 are not impacted by the choice to over-weight the UK stock market in the equity allocation, nor are they impacted by the choice to use a hedged global equity allocation. In the case of over-weighting UK equity, portfolio volatility actually increases at a faster rate across the figure, due to the higher correlation of UK bonds with UK stocks.

²⁴ The results in Figure 7 are nearly identical when examining down-side protection relative to a UK equity portfolio as opposed to the global equity portfolio shown in the figure.

Figure 7. Down-side protection during equity market declines

Distribution of monthly returns during the months with the worst 10% of equity returns, 1985–2012



Notes: Shows the 5th/25th/75th/95th percentile distribution of monthly returns when the global equity market experienced a 10th percentile monthly decline. For reference, the 10th percentile of monthly global equity returns is -5.1%.

Sources: Vanguard, based on the data described in the appendix.

Market composition matters

In large part, the higher historical risk of the UK market can be explained by structural differences in its composition. As we show in **Figure 8a**, relative to the global market, the UK market has been significantly over-weight long maturity bonds. The global market has tended to have a more even distribution across all maturities, while the presence and investment preferences of pension funds and insurance companies in the UK has resulted in higher demand for (and issuance of) long maturity bonds. These bonds have longer duration (**Figure 8b**) meaning they are more sensitive to interest rate changes and have more volatile prices.

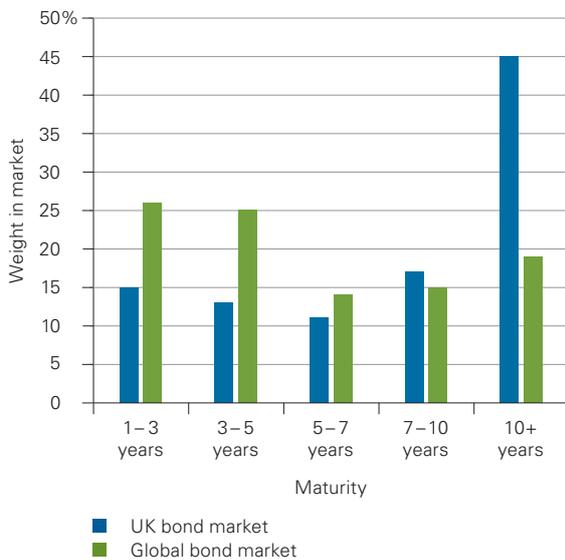
On average since 2001, the UK has been about 2.6 years longer duration than the global market, meaning that for a given 1% rise in interest rates, UK bonds prices will fall 2.6% more than the global market (and vice versa for a fall in interest rates). This longer average duration is likely a contributing factor to the UK having a higher average yield than the global bond market (**Figure 8c**). The yield on

longer maturity bonds tend to have higher yields, reflecting compensation for their higher sensitivity to interest rate movements (this is known as a 'term premium'), so the larger weight of these longer-maturity bonds is reflected in the average yield of the broad UK bond market.

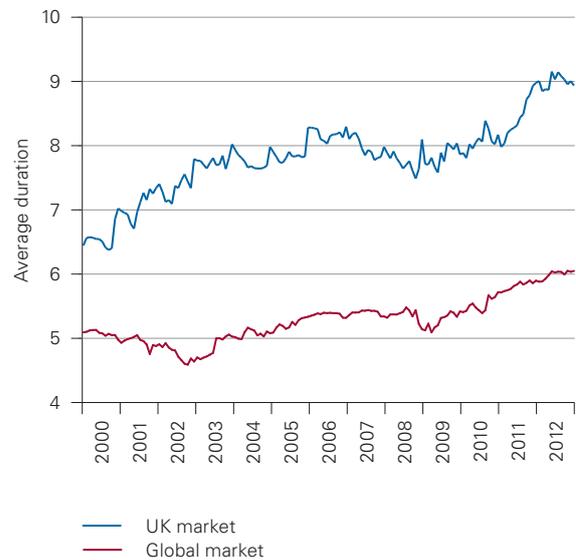
In addition to differences in maturity, duration, and yield, the UK market has structural differences in the types of debt securities available to investors (**Figure 8d**). Different types of issuers have different risks associated with them, and so can drive the risk profile of the UK relative to the global market. Over the past decade, the UK has been over-weight central government debt (UK gilts versus other sovereign issues) and corporate bonds, and under-weight exposure to securitised debt. In addition, the UK has been biased towards high quality Aaa-rated bonds and under-weight the Aa market relative to global market weights. All else equal, this means UK bond investors have been taking less credit risk than the global market as a whole has taken on, potentially giving up yield as a result.

Figure 8. Composition of the UK and global bond markets

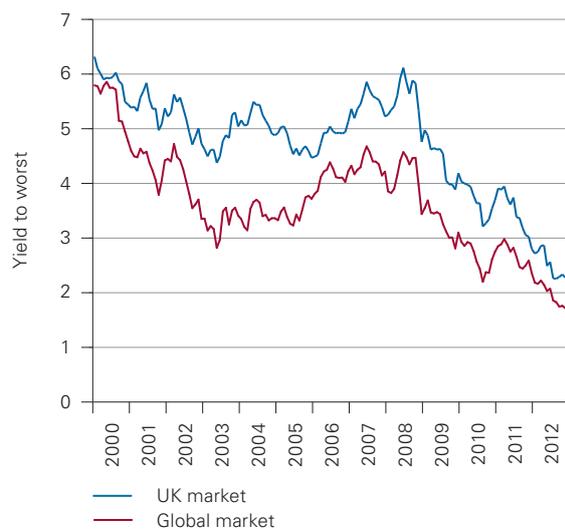
8a. Maturity band weights, December 2012



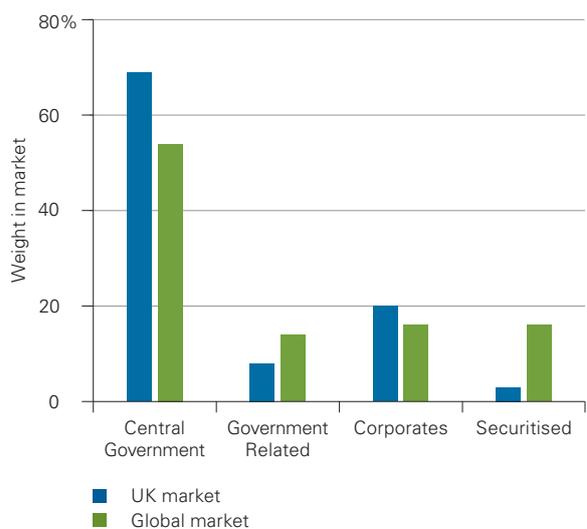
8b. Duration, 2000-2012



8c. Yield, 2000-2012



8d. Sector weights, December 2012



Notes: "Yield to worst" reflects the impact of any imbedded options, effectively showing the worst case yield an investor could earn.

Source: Vanguard, based on the data described in the appendix.

Investors that are considering implementing an over-weight to UK bonds in their asset allocation plan (or those that already have one), should think about the differences in market composition, and the risks and trade-offs associated with such an allocation. While investors may be more comfortable with their home market, a bias towards this market can change the risk characteristics of a portfolio, often in unintended ways. For example, the decision to over-weight the UK bond market is, in a sense, a choice to take on more interest rate risk and less credit risk that the global market average. Swapping one

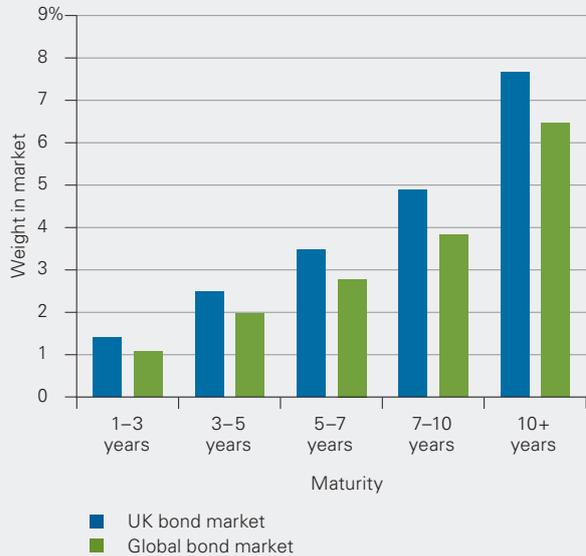
type of risk for another may or may not be in line with the original objective of the investor. Investors should consider the impact of these risk factor differences in the context of their overall portfolio. As we've discussed throughout, examining investments in a portfolio context is key: an investment that may appear, in isolation, to add a certain type of risk to a portfolio can actually provide diversification through interactions with other investments. A global allocation provides maximum diversification across markets and issuers.

Targeting duration

While the UK fixed income market does have longer duration, many investors approach fixed income investing through a targeted maturity investment. This has benefits for those that have defined cash-flow needs at certain horizons, or prefer to take on a set level of interest rate risk. For these investors, the longer overall duration of the broad UK market is not a factor they need to consider, as they are targeting their own duration directly. These investors should also consider a hedged global allocation, as the diversification benefit provided from interactions between assets across many issuers and countries has provided risk reduction benefits in line with those we have discussed when comparing the aggregate markets.²⁵ This is a key: global diversification has worked, even when 'correcting' for the UK market's longer duration.

Figure 9. Targeted maturity investments also benefit from global hedged exposure

9. Average annualised volatility



Notes: Annualised volatility of monthly returns is shown based on data from Jan.2011 to Dec.2012.

Sources: Vanguard, based on the data described in the appendix.

²⁵ In this example, we assume a targeted maturity approach is implemented to manage interest rate risk and overall portfolio volatility. Investors, such as pensions, that are targeting a specific duration to match the movement of a discounted liability are best served by investing in bonds whose discount rate matches that of their liability, a point we discuss further in the following section.

Other considerations for UK investors

Our analysis thus far has shown that a global fixed income allocation with currency risk hedged back to the pound sterling has provided superior diversification and risk reduction when compared with an un-hedged global allocation. In addition, we've shown that a global allocation generally provides superior diversification from the perspective of portfolio risk and sector/credit exposure, when compared to an investment that is more concentration in UK bonds. Given the fact that the average UK investor allocation does maintain a bias towards the domestic market, we outline additional considerations that may 'push' an investor away from a pure global investment.

Liability matching would justify moving away from a purely global allocation. Defined benefit pension funds, insurance companies, and endowments may have pre-determined liabilities in sterling. Typically these investors will have an investment objective that involves tracking these liabilities, at least to some extent. This strategy implies that the 'risk-free' investment is one that matches the movement of the discounted liability, so these investors would favour bonds with an interest rate that matches both the duration and currency of the liability. For those investors with liabilities denominated in pounds, an over-weight toward UK bonds that better match the movement of the discounted liability is certainly justified. However, to the extent that these investors are weighing multiple objectives (long-run return, diversification, and liability-matching), a hedged global fixed income allocation may still have some benefit.

Even without an explicitly stated liability, investors generally might consider over-weighting UK assets to fund future consumption in sterling. To the extent that UK interest rates reflect expectations for UK economic growth and inflation, they will be more tied to the future consumption basket that a UK investor might purchase. Although investors should consider that hedging a foreign investment 'overlays' to some extent the home country interest rate profile, allowing an investor to capture

the interest rate differential that is factored into currency forwards (as discussed on pages 8 and 9). This makes the argument for over-weighting ones home market in a liability management framework somewhat less compelling. And, as mentioned for institutions, in a multi-objective framework, hedged global bonds offer compelling diversification benefits.

Annuitisation at retirement, a specific case of liability matching for individuals, would imply that an investor approaching retirement would favour owning fixed income assets that match the movement of an annuity reference rate. This strategy would provide more certainty on the annuity pay out an investor would receive as they approach the purchase date. Generally, the rates of annuities for sale in the UK reflect the yield on long duration UK government bonds. So an investor planning to annuitise is best served by constructing a portfolio weighted towards long duration UK government bonds.²⁶ Importantly, this strategy applies only to the portion of a portfolio that an investor intends to convert to an annuity. As of April 2011, UK defined contribution pension investors no longer face a compulsory requirement to convert their assets to an annuity at age 75, so many investors may prefer to keep some or all of their portfolio invested and pursue a total return objective.²⁷ Additional factors, such as uncertainty regarding the precise date on which an investor might annuitise, imply a prudent approach likely involves balancing the trade-offs between pure liability-matching and more traditional portfolio diversification. In addition, an annuity-matching strategy only impacts those investors that are later on in their investment life cycle, with younger investors pursuing a total return approach that implies the use of fixed income for diversification. So while a specific allocation to global bonds might be more or less depending on an investor's circumstances and intention to annuitise, global bonds are still a valuable asset class to consider within a fixed income allocation.

26 See Cannon and Tonks (2004).

27 For example, investors may choose to pursue the capped drawdown approach in withdrawing income from their pension, in which case there is flexibility with the amount withdrawn each year, up to a capped limit. Investors that meet the minimum income requirement have even more flexibility with any remaining funds that are not used to meet the £20,000 annual MIR. See HM Treasury site for details: http://www.hm-treasury.gov.uk/consult_age_75_annuity.htm

Perceived risk might result in an investor favouring UK bonds. The global market has a lower average credit rating and a lower weight in government bonds with a larger weight to riskier sectors such as securitised debt. On the surface this may seem to make the global market riskier. However, as we've shown throughout, the diversification effect of adding many un-correlated bonds to a portfolio is quite powerful.

Complexity of hedging currency is likely a factor in holding investors back from global bonds. Particularly for those investors owning individual bonds or building laddered portfolios, the volatility of a foreign bond is intolerable, yet they likely do not have the capability or expertise to hedge currency. This can be addressed by adding a hedged global allocation through exposure through a mutual fund or ETF, thus 'outsourcing' currency management.

Taxes, liquidity, and transaction costs are unlikely to be a significant factor in preventing a UK investor from moving to a more global allocation. While foreign interest may be subject to withholding at the fund level, the UK has double-taxation agreements in place to address this with the majority of the countries that have the largest fixed income markets. Interest income and capital gains distributions from the fund receive the same tax treatment as if they originated in the UK. In addition, liquidity and transaction costs in the US, Japanese, and European fixed income markets are generally better than or reasonably in line with the costs for the UK bond market.²⁸

²⁸ For example, according to SIFMA, average daily turnover in the nominal US Treasury bond market from in 2011 was 10.9% of the Barclays US Treasury Index. Average daily turnover in the UK Gilt market in 2011 from the UK DMO was 3.0% of the Barclays UK Sterling Gilt Index.

Conclusion: consider going global

Global bonds allow UK investors to diversify their fixed income portfolio through exposure to interest rate movements influenced by a variety of international risk factors. We have shown that the currency exposure of un-hedged global bonds adds volatility to a portfolio and, without aggressive assumptions regarding unexpected currency return, is unlikely to benefit investors over the long-term. With currency risk hedged back to sterling, the global fixed income market can fulfil the traditional role of bonds by providing risk-reduction and diversification benefits. In addition, differences in performance characteristics and market structure between UK bonds and the global market have supported the case for a more global allocation. For total return investors, there is little reason not to expand one's investment set. Indeed, without a prior view on which bond market will produce superior performance, the global market can be considered the neutral forward-looking portfolio. With the UK market representing a small, concentrated portion of the world's fixed income securities, we would encourage investors to consider how a global bond allocation may help them meet their broad investment objectives in a strategic asset allocation.

Appendix

Asset Class Sources:

All returns are expressed in pounds sterling on a monthly basis, with income and dividends reinvested. Data covers the period January 1985 through December 2012.

UK stocks are defined as the MSCI United Kingdom Index from Jan. 1985 to Dec. 1985 and the FTSE All-Share Index thereafter.

Global stocks are defined as the MSCI World Index in GBP from Jan. 1985 to Dec. 1987; the MSCI All-Country World Index in USD, translated to GBP from Jan. 1988 to May 1994; the MSCI All-Country World Investable Market Index in USD translated to GBP from Jun. 1995 to Jun. 2007; and the MSCI All-Country World Investable Market Index in GBP thereafter. Translations from USD to GBP are calculated using the end-of-month exchange rate series from the IMF's International Financial Statistics database. In cases where we mention results on a currency-hedged basis, we are referring to the local return series of the stated indices, which will approximate the volatility characteristics of a hedged allocation.

UK bonds are defined as the FTSE United Kingdom Government Index from Jan. 1985 to Dec. 1998 and the Barclay's Capital Sterling Aggregate Index thereafter.

Global bonds (hedged and un-hedged) are defined as hedged and un-hedged versions of the Citigroup World Government Bond Index from Jan. 1985 to Dec 1989, and the Barclay's Capital Global Aggregate from thereafter. Hedged returns are hedged back to GBP, and un-hedged returns include the foreign currency return from translating back to pounds.

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