Going global with bonds: Considerations for euro area investors

Vanguard research | March 2013

With euro area bonds making up a modest 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 prove beneficial within most investors' strategic fixed income allocation.

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 the euro zone within their fixed income allocation.[1,2] Relative to a more euro-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, current issues aside, collectively the Euro zone is a reasonably stable, wealthy, developed economy and therefore likely to provide a safe fixed income investment over the long-term.

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 euro area, 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 euro zone, 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 euro 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 a group of the 7 largest government bond markets are less than perfectly correlated with euro zone interest rates, as measured by the German 10-year bund.

1 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 "euro zone fixed income" to refer to the universe of investment grade bonds issued in euro (86% of which is issued by companies domiciled in euro zone countries, as of 31 December 2012). See the appendix for specific index definitions.

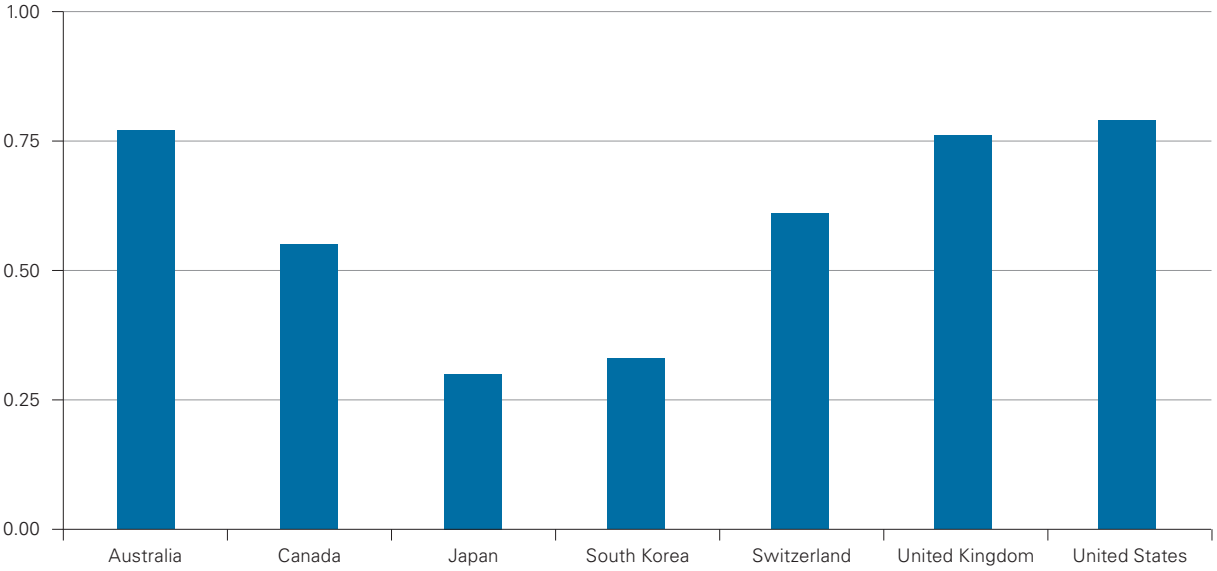
3 Put in more technical terms, expanding one's investment opportunity set can result in an upward shift to the efficient frontier, allowing one to achieve better risk-adjusted return outcomes.

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, see page 13.

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 German 10-year bund, 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 German bund 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?

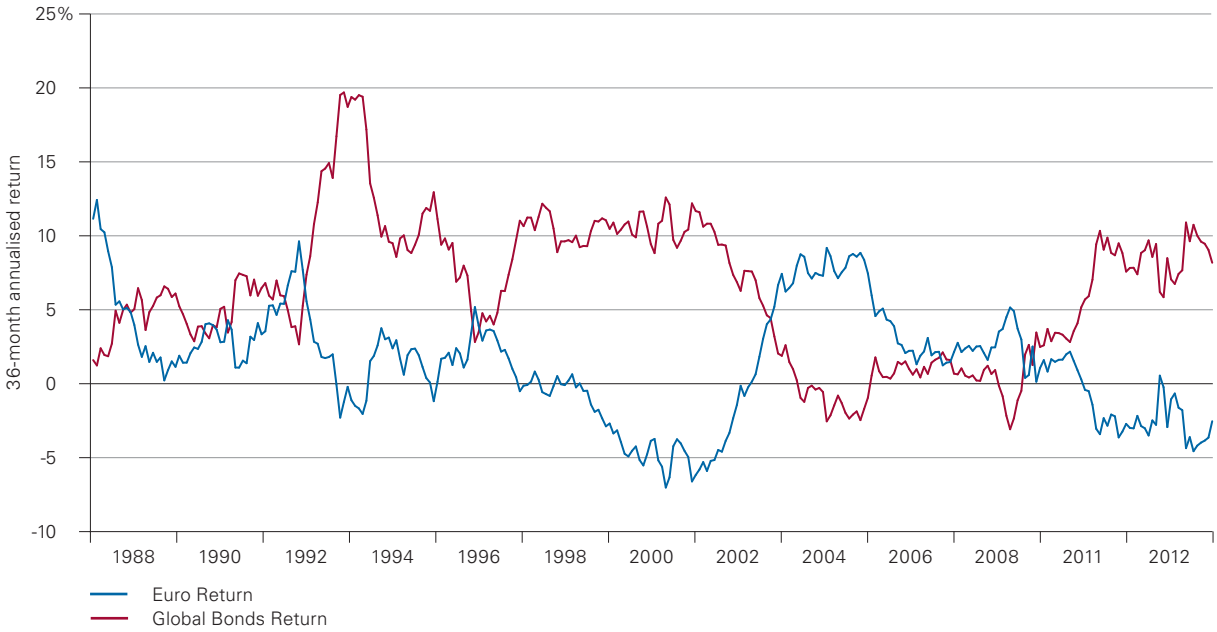
This is an important question, because currency movement is responsible for the majority of the volatility in a market-weighted un-hedged global bond investment.[6] In **Figure 2a**, the strong inverse relationship between global bond returns and the movement of the euro is clearly evident – when the euro depreciates, the foreign currency exposure of global bonds provides positive returns, and vice versa. Indeed, currency has explained 77% of the monthly variance in returns of a global bond allocation since 1985. Returns have been consistently more volatile throughout time than either euro area bonds or hedged global bonds, almost approaching equity-like volatility levels in some periods (see **Figure 2b**). On average, currency has made un-hedged bonds about twice as volatile as either an investment in euro area bonds or global bonds with the currency risk 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

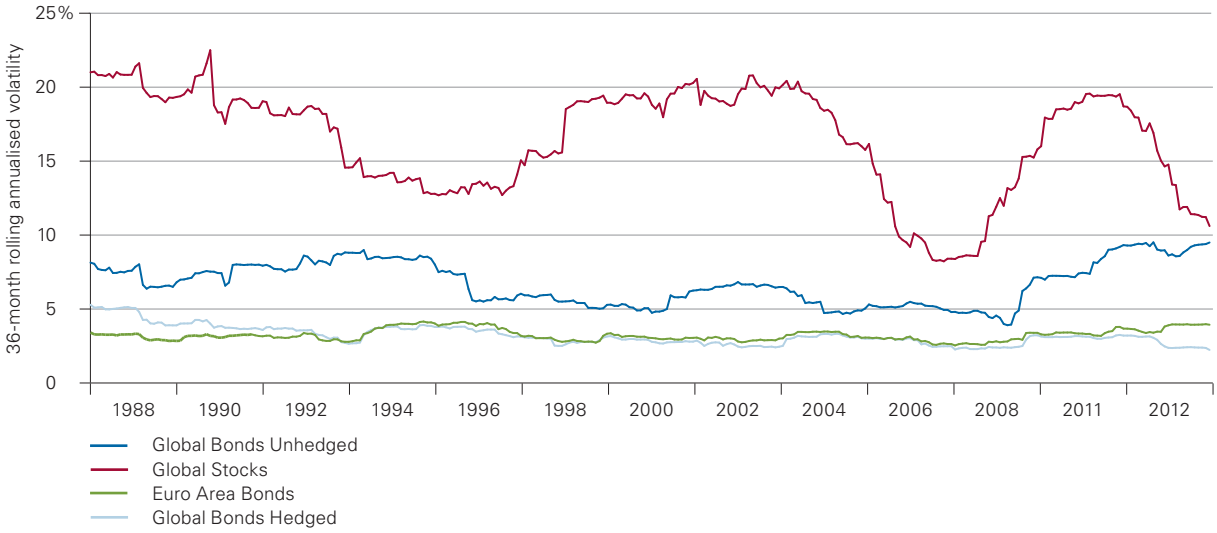
6 Throughout this paper, we use market-weighted benchmarks, as defined in the appendix to represent various asset classes. See Thomas and Bennyhoff (2011) for a discussion of the merits of market capitalisation versus alternative weighting methods.

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 Stocks	Euro Area Bonds	Global Bonds un-hedged	Global bonds hedged
Avg. Volatility 1985-2012	16.7%	3.4%	7.1%	3.4%

Notes: Data covers Feb.1985 through Dec.2012. Euro return in Figure 3a is the inverse of the difference in return between a hedged global bond investment and an un-hedged global bond investment.

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

(Perold and Schulman, 1988). 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.

Currency in a portfolio setting

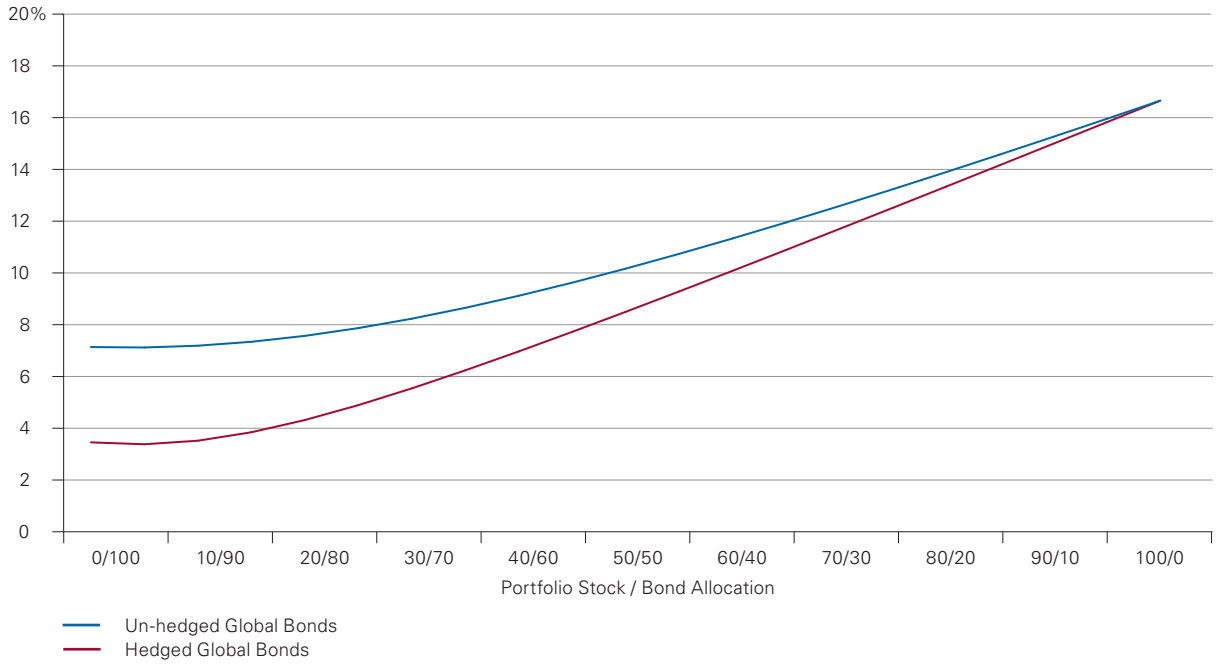
While the foreign currency exposure of un-hedged global bonds has resulted in much higher volatility than a euro zone or hedged global bond allocation, we have to consider the impact of currency correlation when it is placed in a portfolio. We first examine the impact of un-hedged bonds within a risk minimisation framework.[7] 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 nearly half that of a portfolio with un-hedged bonds.

Figure 3. Hedging currency exposure provides superior diversification benefit

Annualised volatility of balanced global stock / global bond portfolios, with either hedged or un-hedged global bonds, Feb.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 euro or un-hedged including the impact of translation back to euro.

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

7 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 euro 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.[8] 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.[9,10]

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. Currency forwards can be used to buy and sell currency at a forward date, eliminating currency volatility from the portfolio.[11] 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 euro. These five currencies comprise about 95% of the global aggregate excluding euro exposure (we exclude the euro 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 aggregate amounted to roughly 3 basis points (0.03%) 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 since 2001. Given the average Total Expense Ratio of active global bond funds available for sale in Europe of 1.12%[12], 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 affected 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.

8 The results in Figure 3 are not impacted by the choice to over-weight the euro zone 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.

9 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.

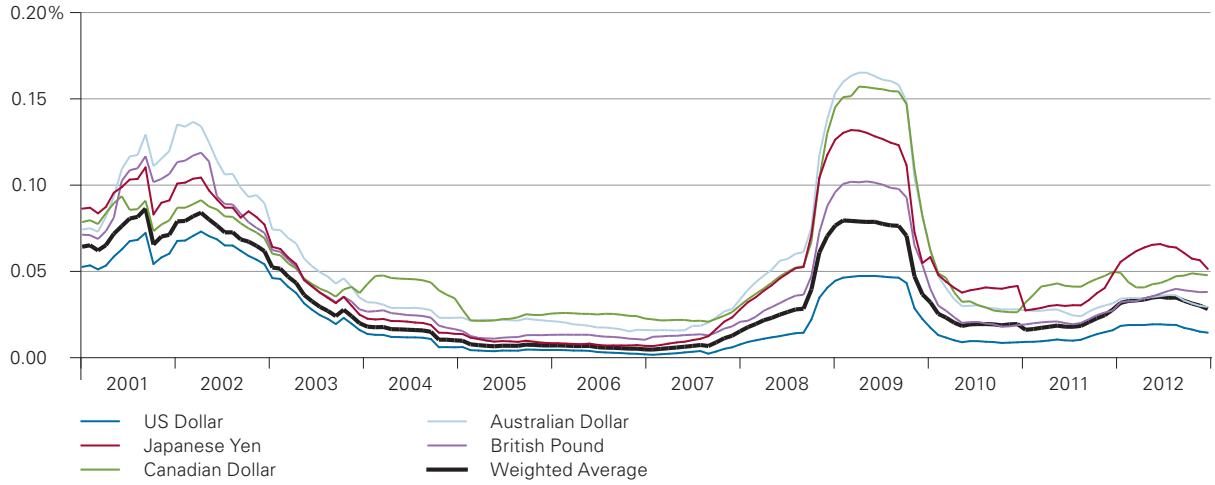
10 If we allow the currency exposure of a balanced portfolio to vary independently of the allocation to global bonds (in other words, treat currency as a separate asset class), it is quite possible that some allocation to currency will provide risk reduction benefits, depending on the specific stock/bond 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.

11 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.

12 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 euro, 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 euro, 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 92.7% and 97.5% of the ex-euro 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, from a risk-minimisation perspective, a hedged global bond investment makes sense for euro zone investors, 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 euro. 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.[13] For example, if the euro area is expected to have a higher future rate of inflation than the United States, market participants would generally sell euro bonds to purchase US bonds, driving up interest rates in the euro area, relative to the US. This higher rate of inflation in the euro zone would also be expected, in the long run, to create downward

13 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).

pressure on the euro exchange rate relative to the dollar.[14] The relationship expressed here generally holds across markets in the long run, 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, allowing a hedged investor the more volatile unexpected portion.[15,16] 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.[17] 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.[18] 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 about 1.0% average annual unexpected currency return (that is: 1.0% average annual foreign currency appreciation beyond the return that 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 in the 30% stock/70% bond portfolio only in modest allocations. It takes fairly aggressive assumptions regarding unexpected euro depreciation (greater than 15% 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.

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 -1.2% per year (meaning that the euro has appreciated on

14 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.

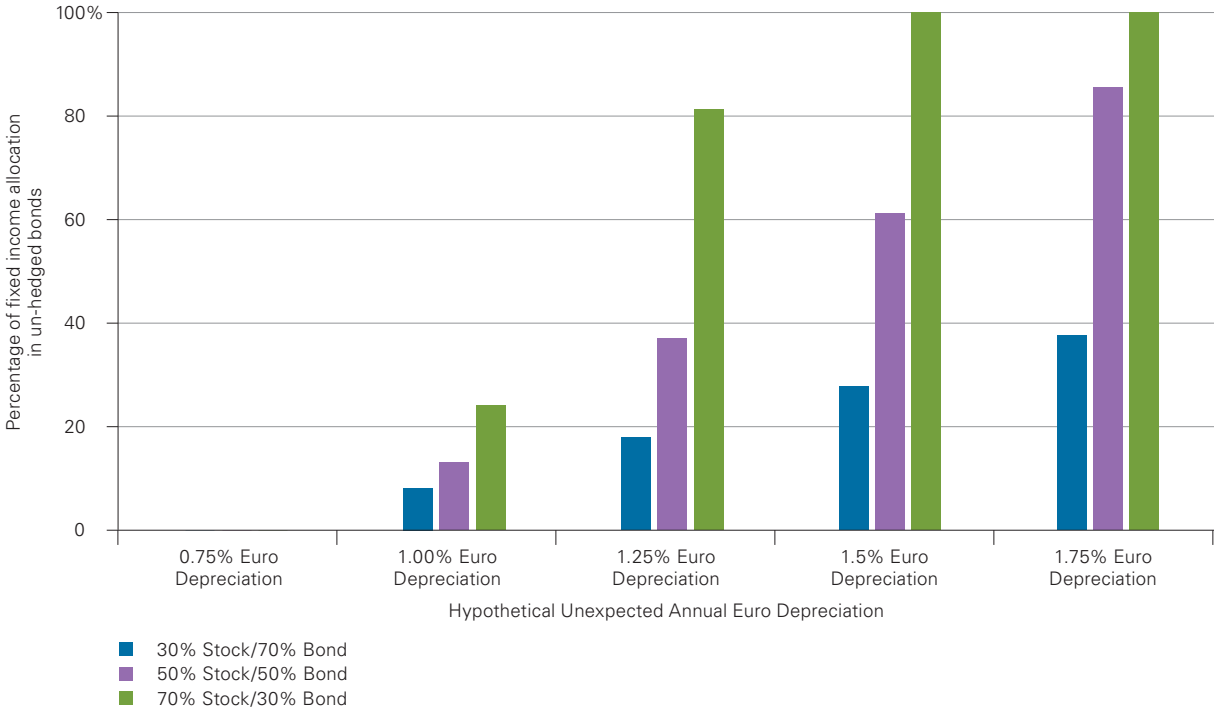
15 The forward premium is the difference in price between a currency's forward and spot exchange rates and can be considered a measure of expected currency return. Selling a currency forward (to hedge an investment) may generate either a positive or negative return relative to the current spot rate, 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.

16 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 6, 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.

17 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.

18 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 6.7% 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 euro depreciation is needed to make un-hedged bonds a viable strategic investment



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 across global stocks, un-hedged global bonds, and hedged global bonds. Further details regarding the inputs to the analysis are on page 9.

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

average over this period). Over this same time period, the return an investor would have realised from hedging this investment was 0.2% per year on average (adjusting for the upper range of transaction costs of hedging from **Figure 4** brings this to roughly 0.1% per year). In other words, the "unexpected" currency return was -1.4% per year (-1.3% after hedging costs), due to euro appreciation as opposed to the depreciation that the forward market had been pricing. This value of -1.4% 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 euro area 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 French fixed income investor had 58% of their portfolio invested in French bonds, implying at least a 33 percentage point over-weight beyond the 25% that the Euro zone represents in the global bond market, even assuming the rest of the portfolio was allocated globally.[19] We discuss the issues particular to home bias in this section.[20]

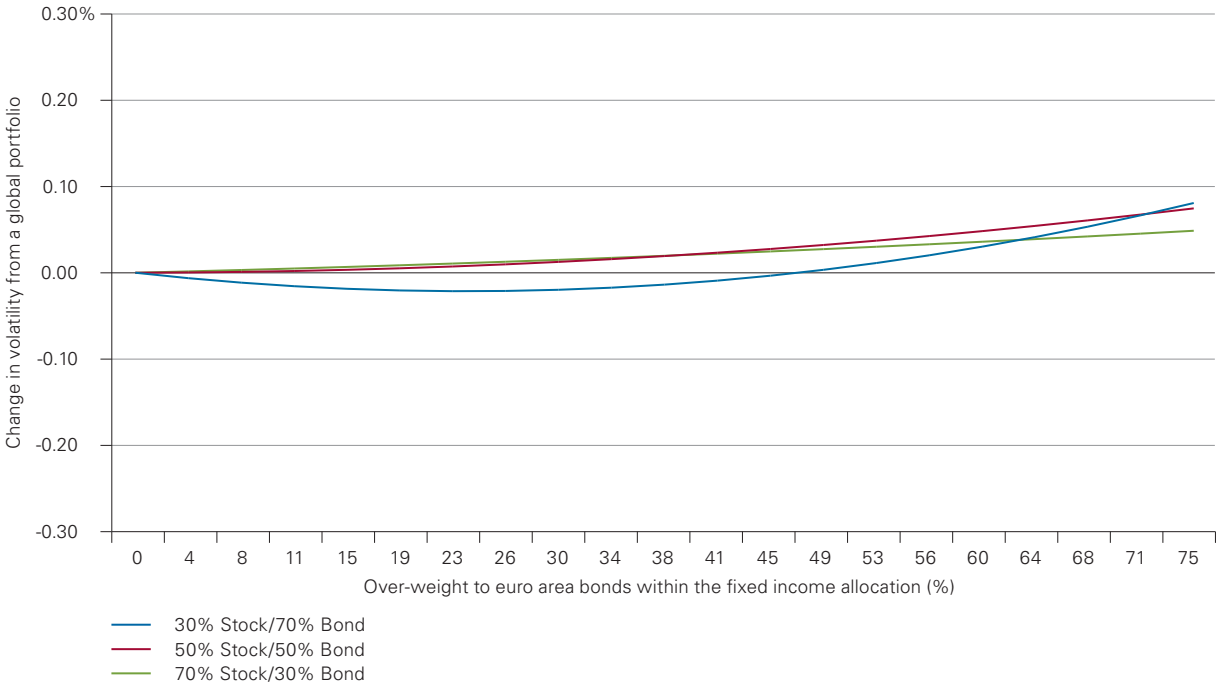
19 See Philips et al (2012b) based on data from the IMF Coordinated Portfolio Investment Survey.

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

At the extreme, an investor owning only euro area bonds is ignoring three-quarters of the investment-grade fixed income securities in the world, and owns a portfolio that is rather concentrated in the risk factors of a single market.[21] We showed in **Figure 2** that, over time, euro area bonds and hedged global bonds have had very similar volatility profiles. In a portfolio context, the low correlation of the euro zone bond market to the global equity market has offered little to 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 euro zone fixed income had little impact on average portfolio volatility. Results varied slightly depending on the specific stock/bond asset allocation, but volatility was within 0.1% annualised of a global allocation across the board.[22] Although not shown in the figure, the results since 2000 are similar and, if anything, suggest over-weighting euro area bonds can increase risk at the margin. Overall, these results suggest that historical volatility metrics do not provide a compelling case to over-weight euro area fixed income.

Figure 6. There has been minimal volatility impact from over-weighting Eurozone fixed income

Volatility change from over-weighting euro zone bonds within the fixed income portion of a global stock/ global hedged bond portfolio, Feb.1985-Dec.2012



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

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

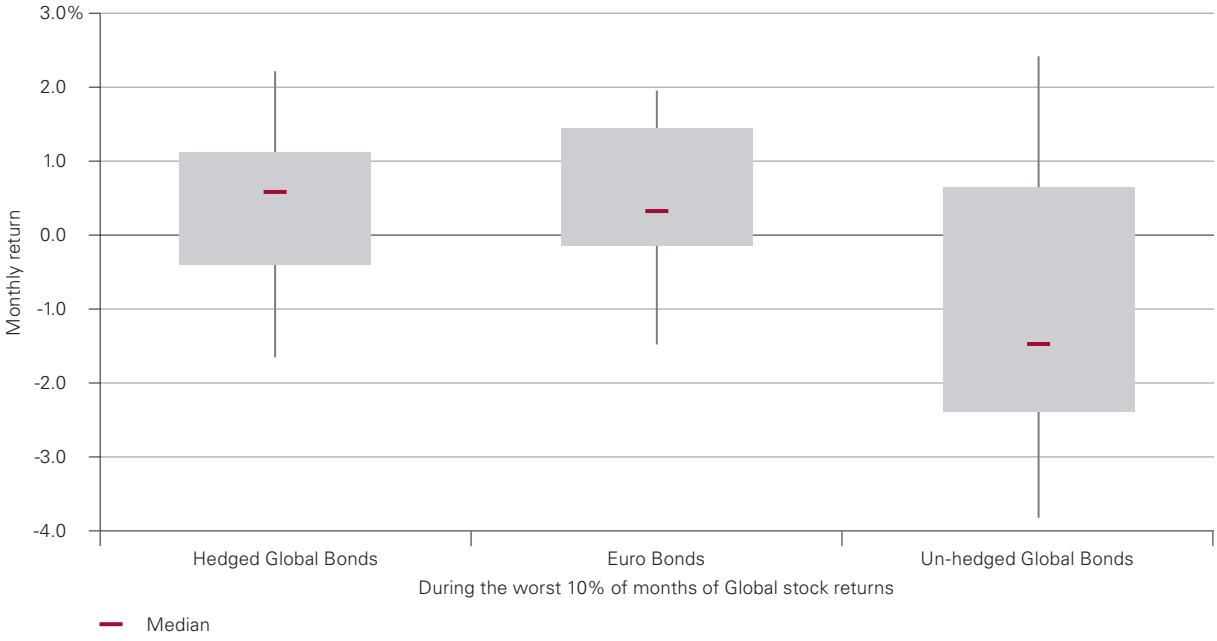
21 The market value of the Barclays Euro Aggregate was 25.2% of the Barclays Global Aggregate as of 31 December, 2012.

22 The implications of Figure 6 are not impacted by the choice to over-weight the euro zone 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 euro zone equity, portfolio volatility actually increases at a faster rate across the figure, due to the higher correlation of euro zone bonds with euro zone stocks.

If average volatility is not a factor justifying an over-weight to euro area bonds, perhaps diversification during market stress is playing a role? When we examine the 10th percentile of monthly equity returns in the global equity market, we find that hedged global and euro area bonds have provided very similar downside protection, as shown in **Figure 7**. Both an investment in euro zone bonds and a hedged global bond investment have produced similar downside protection in the form of a generally positive and tight distribution of returns, relative to an un-hedged global bond investment, meaning more consistency for investors during poor equity market returns.[23] The traditional role of fixed income is to buffer a portfolio from short-term equity market declines and both a global and euro zone bond investment have performed this role rather well over history. Neither has generated significantly different results: the median outcome is a bit higher for global bonds, while the middle distribution is a bit higher for euro area bonds, but these differences are marginal. So here too, the data do not seem to provide significant justification for a home bias to euro zone bonds.

Figure 7. Equity downside protection across fixed income markets

Distribution of monthly returns during the months with the worst 10% of global equity returns, Feb.1985 – Dec. 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 -5.3%.

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

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

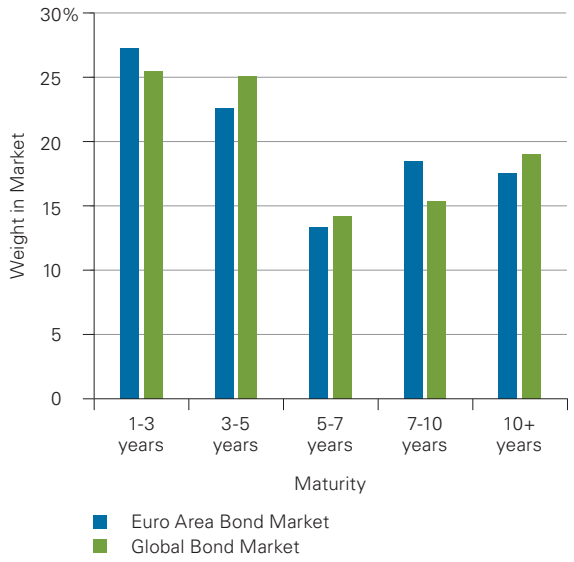
Market composition matters

While a pure examination of statistical volatility seems to indicate that a global bond investment and an investment in euro area bonds offer very similar risk profiles, it is important to consider the underlying market composition as well. Investors that are evaluating an over-weight (or under-weight) to euro area bonds should consider the risk characteristics that may be introduced into their portfolio as a result of any regional tilts relative to the global market.

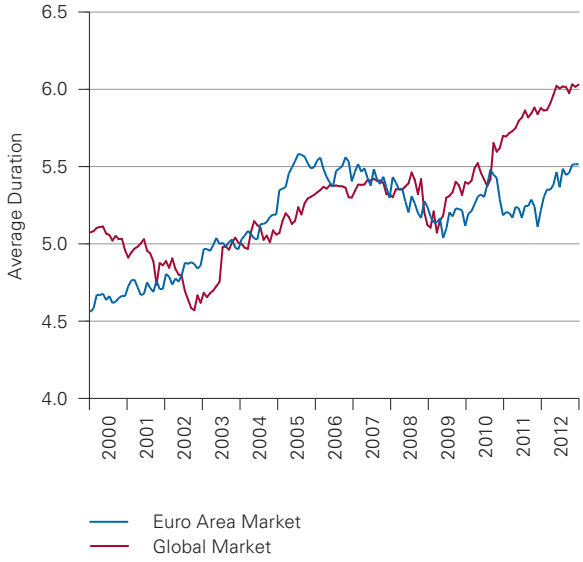
As we show in **Figure 8a**, the euro zone market has a maturity distribution that is reasonably in line with that of the global market. Although not shown, similar conclusions can be reached about sector differences: the euro zone has a broadly similar split between the large sectors as the global market. Despite these similarities, the euro market has a duration that is currently roughly 0.5 years shorter (**Figure 8b**). This is largely due to the fact that the average yield of a euro area fixed income investment has been higher than the global market over the past several years, notably toward the end of 2011 when euro area bonds yielded over 100 basis points more than the global market. All else equal, a higher yielding bond has a lower duration, meaning its price will be less sensitive to general movements in interest rates.

Figure 8. Composition of the euro area and global bond markets

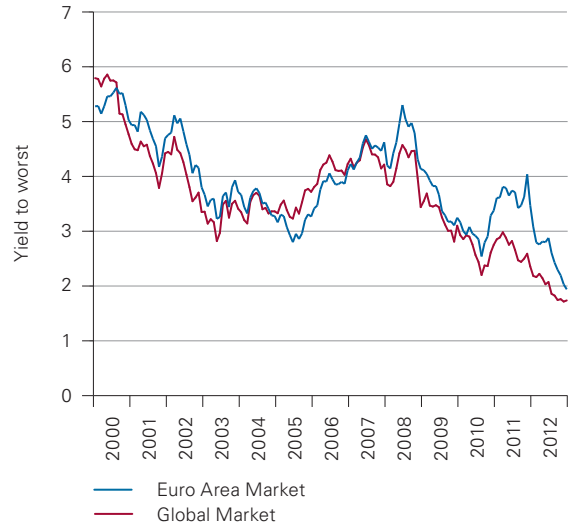
8a. Maturity band weights, December 2012



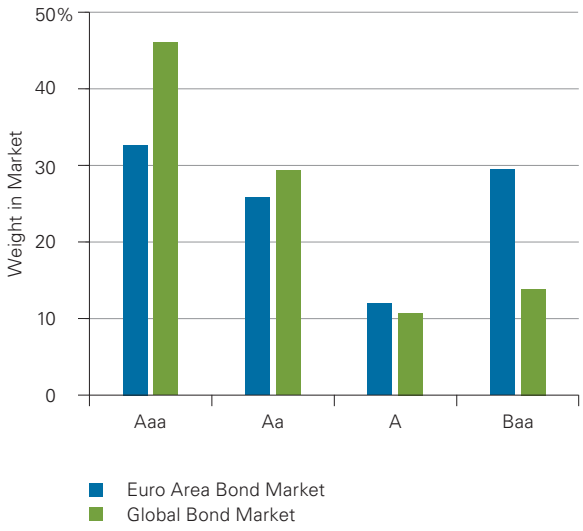
8b. Duration, 2000-2012



8c. Yield, 2000-2012



8d. Credit quality 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.

This lower duration and higher yield at present reflects the recent developments within the euro area. Since the end of the recession in 2008 and 2009, market participants have assigned a higher risk premium to issuers in the peripheral euro zone countries.[24] Until the past few years, credit quality in the euro zone was broadly similar to that of the global market. However, the continuing focus on the solvency of peripheral governments within the currency area has led to a re-assessment of the general credit quality across the euro area market, as shown in Figure 8d. While we would argue that a diversified portfolio of euro zone bonds is not a bad investment per se, it is worth pointing out that the euro zone faces risk factors that are rather different than those of the global market at present. Euro area bond prices have been extremely sensitive to political developments, regulatory decisions, and structural reforms regarding the monetary union. Investors should be aware that the credit quality and nature of credit risk in the euro zone in the current environment is unique when compared to a globally diversified investment. An investor may or may not want to achieve additional exposure to these risks, but it's very much worth paying attention to them when setting a strategic fixed income allocation.

Investors that are considering implementing an over-weight to euro zone 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 euro zone bond market is, in a sense, a choice to take on more credit risk and less interest rate risk than the global market as a whole. The opposite is true for those investors considering under-weighting the euro zone to avoid the current risks associated with the peripheral sovereigns. 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, in isolation, may appear 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.

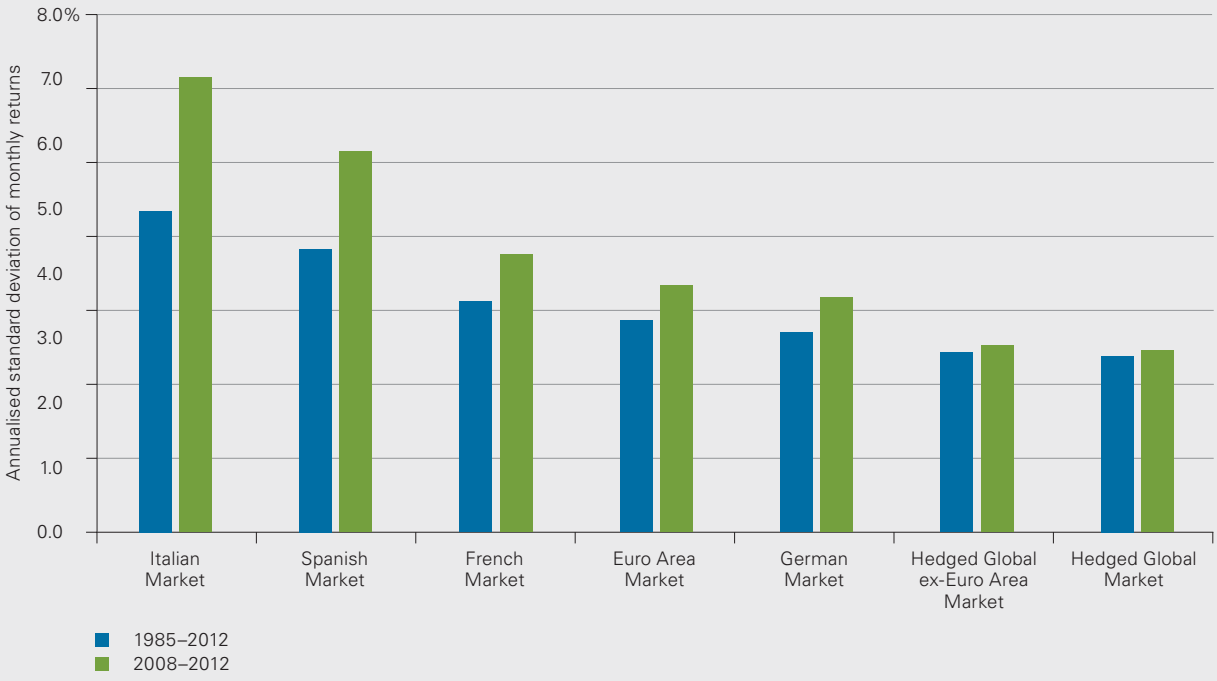
24 Generally speaking, the peripheral euro zone countries include Greece, Portugal, Ireland, Italy and Spain. Indeed, in 2010 and 2011, the government debt of Greece and Portugal was downgraded to a below investment grade rating, and these issues were dropped from many benchmark indices, including the Barclays Euro Aggregate.

Sovereign risk and the power of diversification

The euro area fixed income markets have been in sharp focus over the past several years, the result of many of the peripheral sovereign issuers experiencing financing pressure since the recession in 2008–2009. While many investors may consider avoiding the perceived trouble spots, either under-weighting certain countries (and thus over-weighting the perceived safer issuers) or under-weighting the euro area market as a whole, perhaps a more prudent approach is to set and maintain a global allocation.

A hedged global allocation has provided a better alternative, in terms of risk reduction, to investing in any of the largest single euro area markets, as well as broader allocations that include all euro area issuers or invest only in non-euro-area bonds. As we show in Figure 9, a hedged global bond allocation has provided the lowest volatility outcome, both back to 1985 and during the more recent period when euro area fixed income markets have come under pressure. This demonstrates the powerful effect of holding many different issuers in a broadly diversified portfolio: The risks of any single issuer tend to wash out over time, so an investor is often better off owning everything in market proportion.

Figure 9. The broadest portfolio often provides better outcomes than picking or excluding individual markets



Notes: Figure displays annualised standard deviation of monthly returns for each market. Italian, Spanish, French, and German markets are represented by their respective country components of the Barclays Euro Aggregate Index. The euro area market is represented by the Barclays Euro Aggregate Index. The global ex-euro-area market is represented by the Barclays Global Aggregate ex-euro Index (hedged to euro). The gobal market is represented by the Barclays Global Aggregate Index (hedged to euro).

Sources: Vanguard, based on data from Barclays.

Other considerations for euro investors

Our analysis thus far has shown that a global fixed income allocation with currency risk hedged back to the euro 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 similar, if not superior, diversification from the perspective of portfolio risk and sector/credit exposure, when compared to an investment that is more concentrated in euro area bonds. Given the fact that the average euro area investor allocation does imply 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, endowments, and individuals planning on purchasing an annuity at retirement may have pre-determined liabilities in euro. Typically these investors will thus 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 euro, an over-weight toward euro zone bonds that better matches the movement of the discounted liability is certainly justified. However, to the extent that these investors are weighting 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 euro-denominated assets to fund future consumption in euros. To the extent that euro area interest rates reflect expectations for euro zone economic growth and inflation, they will be more tied to the future consumption basket that a euro zone investor might purchase. Although investors should consider that hedging a foreign investment overlays to some extent the domestic market's interest rate profile, allowing an investor to capture the interest rate differential that is factored into currency forwards. This makes the argument for over-weighting ones home market in a liability management framework somewhat less compelling. And, in a multi-objective framework, hedged global bonds can still play a role in a diversified portfolio.

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 may 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 euro area investor from moving to a more global allocation. While foreign interest may be subject to withholding at the fund level, most euro zone countries have double-taxation agreements in place to address this with the majority of the countries that have the largest fixed income markets. In addition, liquidity and transaction costs in the largest (US and Japan) fixed income markets are generally better than, or at least in line with, the costs for euro bond markets.[25]

25 For example, according to SIFMA, average daily turnover in the nominal US Treasury bond secondary market from 2011 was 10.9% of the Barclays US Treasury Index. According to the Bundesbank, average daily turnover in the same year within the German bund secondary market was 2.6%.

Conclusion: consider going global

Global bonds allow euro zone 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 euro, the global fixed income market can fulfil the traditional role of bonds by providing risk-reduction and diversification benefits. While differences in performance characteristics between euro zone bonds and the global market have been modest over our sample, we ask the question: Why not go global? With a potentially low-cost hurdle to exposure and no negative impact over the sample, there is little reason for total return investors not to expand their investment set. Indeed, without a prior view on which bond markets will produce superior performance, the global market can be considered the neutral forward-looking portfolio. With the euro zone bond market representing a relatively small 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 euro (or a spliced local currency index to approximate historical euro equivalent) on a monthly basis, with income and dividends reinvested. Data covers the period February 1985 through December 2012.

Euro area stocks are defined as the cap-weighted combination of returns of the individual euro zone member country indices from MSCI, in local currency terms, from Feb. 1985 to Dec.1987; the MSCI EMU Index in local currency terms from Jan.1988 to Dec.1998; and the MSCI EMU Investable Market Index in euro from Jan.1999 thereafter.

Global stocks are defined as the MSCI World in USD, translated to euro from Feb.1985 – Dec.1987; the MSCI All-Country World Index in USD, translated to euro Jan.1988 – May1994; the MSCI ACWI Investable Market Index in USD, translated to euro from Jun.1994 – Dec.1998; and the MSCI ACWI Investable Market Index in euro from Jan.1999 thereafter. Translations from USD to EUR are calculated using the end-of-month value of the spliced euro/deutchsmark exchange rate from Moody's Analytics. 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.

Euro zone bonds are defined as the cap-weighted combination of returns of the individual euro zone member country indices from Citigroup's World Government Bond Index series, in local currency terms, from Feb.1985 to May.1998; and the Barclays Euro Aggregate Index from Jun.1998 and 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 Barclays Capital Global Aggregate thereafter. Hedged returns are hedged back to euro, and un-hedged returns include the foreign currency return from translating back to euro.

References

Engel, Charles, 1995. *The forward discount anomaly and the risk premium: A survey of recent evidence*. NBER Working Paper 5312. Cambridge, Mass: National Bureau of Economic Research.

Hamilton, James, and Cynthia Wu, 2012. *The effectiveness of alternative monetary policy tools in a zero lower bound environment*. Working Paper, available at: http://dss.ucsd.edu/~jhamilto/zlb.pdf.

Hodrick, Robert, 1987. *The empirical evidence on the efficiency of forward and futures foreign exchange markets*, Volume 24 in Fundamentals of Pure and Applied Economics, edited by Jacques Lesourne and Hugo Sonnenschein, Harwood Academic Publishers, 1987.

LaBarge, Karin Peterson, 2010. *Currency Management: Considerations for the Equity Hedging Decision*. Valley Forge, Pa.: The Vanguard Group.

Mark, Nelson C., 1995. Exchange Rates and Fundamentals: Evidence on Long-Horizon Predictability. *American Economic Review 85(1)*: 201–18.

Meese, Richard A., and Kenneth S. Rogoff, 1983. Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample? *Journal of International Economics 14*: 3–24.

Meredith, Guy, and Menzie D. Chinn, 1998. *Long-Horizon Uncovered Interest Rate Parity*. NBER Working Paper 6797. Cambridge, Mass.: National Bureau of Economic Research.

Perold, André F., and Evan C. Schulman, 1988. The Free Lunch in Currency Hedging: Implications for Investment Policy and Performance Standards. *Financial Analysts Journal 44(3)*: 45–50.

Philips, Christopher, Joseph Davis, Andrew Patterson, and Charles Thomas, 2012a. *Global fixed income: considerations for US investors.* Valley Forge, PA: The Vanguard Group.

Philips, Christopher., Francis Kinniry Jr., and Scott Donaldson, 2012b. *Role of home bias in global asset allocation decisions*. Valley Forge, PA: The Vanguard Group.

Philips, Christopher, Charles Thomas, and Jeffery Molitor, 2012c. *Global fixed income: Considerations for euro zone investors.*

Thomas, Charles and Donald Bennyhoff, 2011. *A review of approaches to alternative fixed income indexing*. Valley Forge, PA: The Vanguard Group.

Connect with Vanguard™ > global.vanguard.com

Important information

This document is directed at investment professionals, and should not be distributed to or relied upon by retail investors.

Vanguard Asset Management, Limited only gives information on products and services and does not give investment advice based on individual circumstances.

The material contained in this document is not to be regarded as an offer to buy or sell or the solicitation of any offer to buy or sell securities in any jurisdiction where such an offer or solicitation is against the law, or to anyone to whom it is unlawful to make such an offer or solicitation, or if the person making the offer or solicitation is not qualified to do so. The information on this document does not constitute legal, tax, or investment advice. You must not, therefore, rely on the content of this document when making any investment decisions.

The Manager of Vanguard Funds plc is Vanguard Group (Ireland) Limited. Vanguard Asset Management Limited is the distributor of Vanguard Funds plc. Vanguard Funds plc has been authorised by the Central Bank of Ireland as a UCITS and has been registered for public distribution in certain EU countries. Prospective investors are referred to the Funds' prospectus for further information. Prospective investors are also urged to consult their own professional advisors on the implications of making an investment in, and holding or disposing shares of the Funds and the receipt of distributions with respect to such shares under the law of the countries in which they are liable to taxation.

Issued by Vanguard Asset Management, Limited which is authorised and regulated in the UK by the Financial Conduct Authority.

VAM-2013-04-09-0693