

International fixed income: Not all negative

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- In 2019, the amount and duration of negative-yielding debt outstanding surged. Though troubling, such headline risk does not truly represent the experience of U.S.-based investors with foreign currency exposure embedded in a globally diversified fixed income portfolio.
- For investors who choose to diversify their fixed income portfolios with holdings outside of the U.S., hedging currency exposure (also known as foreign exchange, or FX, exposure) on a systematic basis can help mitigate portfolio volatility in exchange for the market's pricing of expected currency returns.
- Over the long term, expected returns should closely match an investor's local market return on both a hedged and an unhedged basis, with the former providing a narrower range of excess return. Ultimately, the only difference in long-term return expectations between an international fixed income portfolio—hedged or unhedged—and a domestic one should be due to differences in credit exposure.

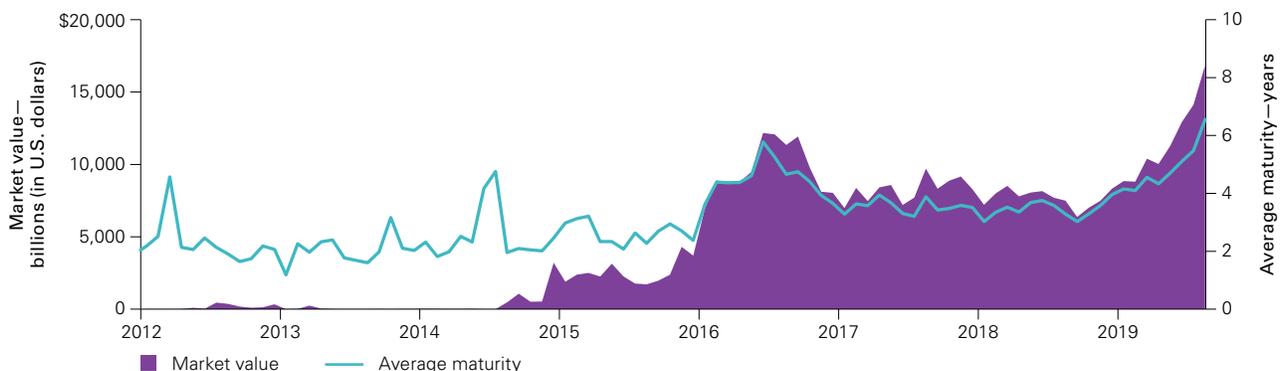
Introduction

International fixed income can play an important role in an investment portfolio, whether owned by an individual or a large endowment or foundation. As the largest asset class, it offers greater coverage of the investable universe, which may help lower volatility without sacrificing long-term returns. However, some U.S.-based investors may be concerned about negative-yielding debt in the market. In this research note, we examine the dynamics behind currency hedging and the role it plays for U.S.-based investors, particularly those invested in negative-yielding international debt.

Currency hedging for global fixed income

Recently, the topic of negative-yielding debt has gripped financial headlines, and rightfully so. The notion of assuming financial risk only to receive less than your initial investment value at maturity—even before accounting for the effects of inflation—defies financial theory. And yet, this is the world we have lived in since August 2014. Moreover, the extent of this phenomenon has only spread (as shown in **Figure 1**), in terms of both the amount of negative-yielding debt outstanding and the duration for which people are willing to lend at negative rates.

Figure 1. The magnitude of negative-yielding debt reached new highs in 2019



Source: Vanguard calculations, using data from Barclays Live.

A U.S.-based investor focused solely on nominal yields overlooks a critical component of international investing: foreign currency exposure. Ultimately, a foreign investment represents a long position in both the underlying security and the currency in which it was issued. In the short and intermediate term, the currency component can be highly volatile.

As shown in **Figure 2**, the historical volatility of regional currency has been significantly higher than that of each local fixed income market. For example, the Japanese yen has been almost six times more volatile than the Japanese fixed income market in local terms. Accordingly, unhedged international fixed income exhibits higher volatility than the same fixed income index in local currency.

Figure 2. Currencies can be significantly more volatile than local fixed income

	 Euro zone		 Japan		 Switzerland	
	Currency	Bonds	Currency	Bonds	Currency	Bonds
Volatility of monthly return	2.88%	0.93%	3.03%	0.54%	3.08%	2.08%
Ratio of volatilities (FX/bonds)	3.08**		5.61**		1.48**	

Notes: We used the F-test statistic to determine whether the ratio of volatilities (variances) of currency and bond returns is statistically significant. The variances for euro-zone FX and bonds were 0.08% and 0.01%, respectively; for Japan, 0.09% and 0.003%; and for Switzerland, 0.1% and 0.04%. We find, for example, that the volatility of Japanese yen returns is statistically greater than that of Japanese bonds.

** indicates statistical significance at the 1% level.

Source: Vanguard calculations, using data from FactSet. For the euro zone, bonds are represented by the Bloomberg Barclays Euro Aggregate Index; for Japan, by the Bloomberg Barclays Asia Pacific Aggregate Japan Index; and for Switzerland, by the Bloomberg Barclays Swiss Franc Aggregate Index. Data cover August 1, 1999, to August 31, 2019, for the euro zone and Switzerland and June 1, 2004, to August 31, 2019, for Japan.

Notes on risk

All investing is subject to risk, including possible loss of principal. Diversification does not ensure a profit or protect against a loss.

Past performance does not guarantee future results. Bond funds are subject to interest rate risk, which is the chance bond prices overall will decline because of rising interest rates, and credit risk, which is the chance a bond issuer will fail to pay interest and principal in a timely manner or that negative perceptions of the issuer’s ability to make such payments will cause the price of that bond to decline.

There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income.

The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Investments in securities issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Currency hedging transactions incur extra expenses, may not perfectly offset foreign currency exposures, and may eliminate any chance to benefit from favorable fluctuations in those currencies.

The low volatility of fixed income, in addition to its low correlation with equity, is one of the main reasons to include it in a portfolio. Hedged currency exposure in international fixed income preserves volatility in line with local market fixed income returns.

From a return perspective, two sovereign bonds of equal quality should provide the same total return if held to maturity regardless of whether the position was implemented on a hedged or unhedged basis; otherwise, an arbitrage opportunity would arise.

This is extremely important as it relates to a common misconception that hedging FX exposure actually removes the currency return from an international fixed income

Figure 3a. Accounting for the effects of hedging provides a better representation of foreign yields

Hedge-adjusted yield = Nominal yield (local bond) + Hedge currency return

$$\text{Hedge currency return} = \left(\frac{S * \frac{1 + R_{Dom}}{1 + R_{For}} + XCCY \text{ basis} - \text{Hedging costs}}{S} \right) - 1$$

Where: $S = \text{Spot price}$ $R_{Dom} = \text{U.S. rate}$
 $R_{For} = \text{Foreign rate}$ $XCCY = \text{Cross-currency basis}$

Notes: Using one-month currency swaps to fund and hedge foreign bond purchases technically involves “borrowing” the foreign currency and “lending” U.S. dollars. As with any short-term funding, there are rates associated with borrowing and lending, and these differ from currency to currency. This is known as “cross-currency basis.”

Source: Vanguard.

position. Rather, it is a means of securing market pricing of expected currency returns versus being exposed to actual currency fluctuations, which can—and do—differ significantly from market expectations. Hedging FX risk on a systematic basis helps retain the risk profile of the underlying fixed income instrument while leaving long-term return expectations intact.

Figure 3 shows a form of the covered interest parity formula for calculating a U.S.-based investor’s hedge-adjusted yield. This is a truer representation of expected yield because it incorporates both the yield in the foreign market and the hedged currency return (the market’s expected currency return), expressed through interest rate differentials.

Figure 3b. An example of hedged currency return using July 2019 Japan currency and interest rate figures

$$\text{Hedge currency return} = \left(\frac{109 * \frac{1 + 1.96\%}{1 + -0.15\%}}{109} \right) - 1 = 2.11\%$$

Where: $USDJPY \text{ spot price} = 109$ $U.S. \text{ short rate} = 1.96\%$
 $Japan \text{ short rate} = -0.15\%$ $Hedge \text{ currency return} = 2.11\%$

Notes: This calculation is based on available data. Actual hedge return may differ because of hedging costs, execution, and month-end forward rates. Cross-currency basis and hedging costs are excluded as they are not directly observable and are expected to be de minimis in the long run.

Source: Vanguard.

What it means for the U.S.-based investor

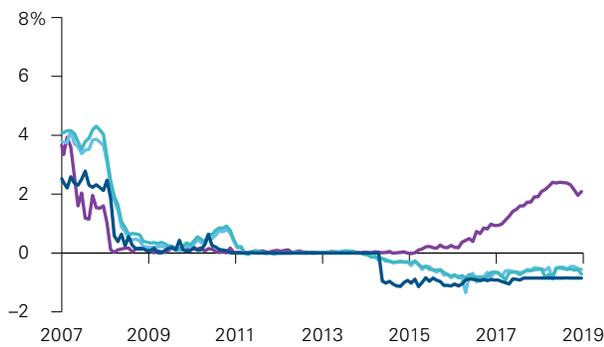
Applying the above formula to the same list of currencies whose countries have negative-yielding debt outstanding (as in **Figures 4a** and **4b**) shows that with the hedged currency return, the yield on short-term foreign debt closely approximates that of the U.S. market. When the FX exposure of a longer-dated fixed income security (10-year bond) is hedged to maturity (as illustrated in **Figures 4c** and **4d**), the results are very similar.

In reality, it is highly impractical to implement a hedge that far out on the curve because of a lack of available market participants. Instead, continuously rolling short-term currency forwards or swaps is a common practice for ensuring a portfolio's foreign exposure is constantly hedged.

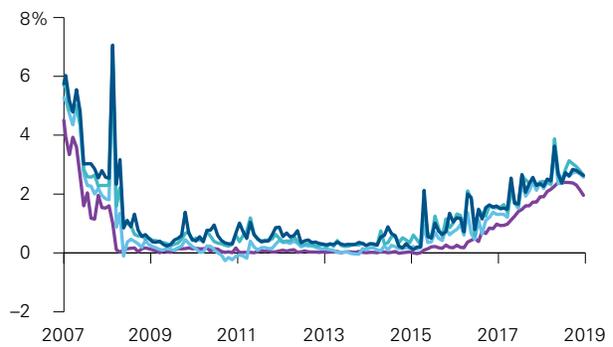
When the duration of the portfolio is greater than that of the hedging program, the short- and intermediate-term impact of hedging at the portfolio level will depend on the yield curve structure (or term premium) in each market relative to an investor's local market. These performance differences should wash out in the long term.

Figure 4. Foreign yields closely follow U.S. yields on a hedge-adjusted basis

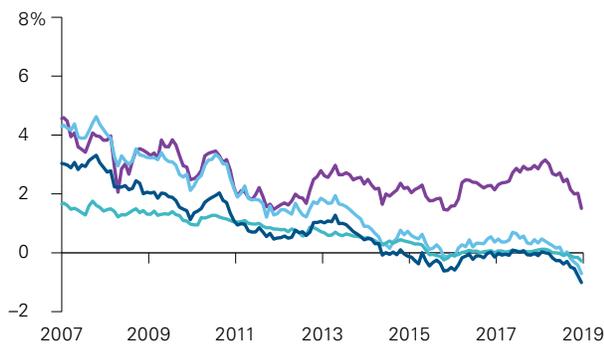
a. Nominal one-month yield



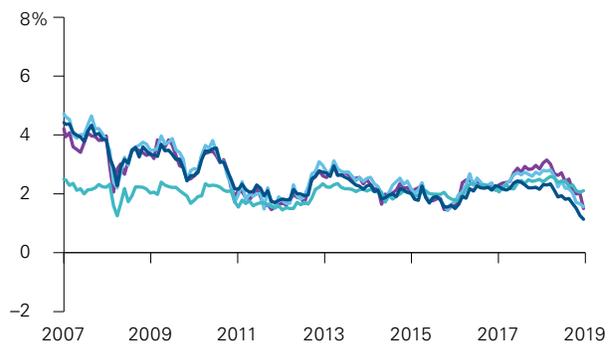
b. Hedge-adjusted one-month yield



c. Nominal 10-year yield



d. Hedge-adjusted 10-year yield



- United States
- Euro zone
- Japan
- Switzerland

Notes: Nominal one-month and 10-year yields are represented by the one-month and 10-year annualized benchmark yields of each sovereign government. For the euro zone, the benchmark yield is a composite of all euro zone countries. The hedge-adjusted yields are calculated by using the benchmark month-end one-month and 10-year forward rates for a given currency to compute the currency return and applying the hedge return to the currency's sovereign benchmark yield. Data cover the period from August 1, 2007, to August 31, 2019.

Source: Vanguard calculations, using data from Bloomberg and FactSet.

Term premiums refer to the steepness of sovereign yield curves—the difference between short-term and long-term interest rates. **Figure 5** includes two simplified examples of different hypothetical yield curves ranging from more to less favorable in terms of their contribution to portfolio returns.

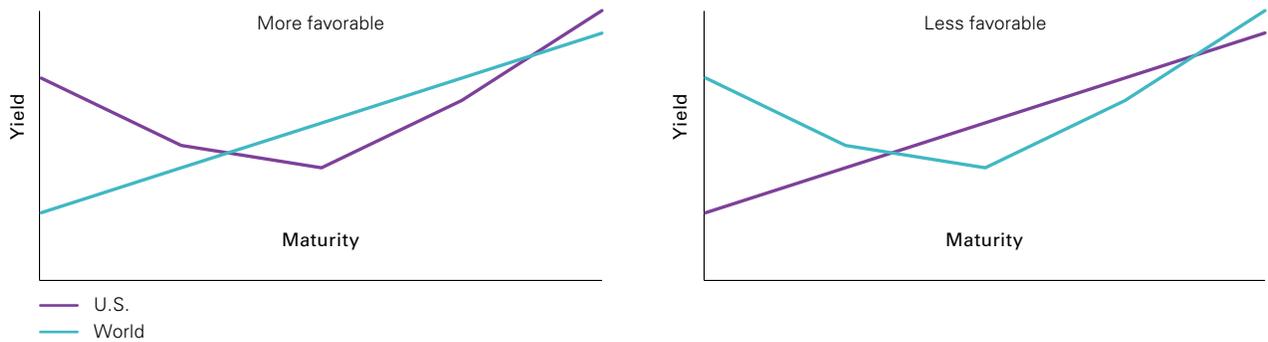
For these examples, we assume a hedging program that consists of rolling short-term forwards or swaps on a globally diversified fixed income portfolio that spans a broad range of maturities. In the more favorable scenario, the U.S.-based investor’s FX hedge is driven by the higher short-term domestic rate as compared with the relatively lower foreign short-term rate. The result is a positive impact from hedging on both short- and long-dated maturities. In the less favorable scenario, the

opposite is true, resulting in a negative contribution from hedging. Regardless of the performance impact, the benefit of volatility reduction will persist.

At different times, the return from hedging can be positive or negative because of differences in yield curves. But theoretically, that profit or loss should be offset by an equivalent change in currencies, leaving an investor indifferent from a total return perspective.

Of course, the market’s pricing of expected currency returns can deviate significantly, and for extended periods, from future realized currency returns. Remaining unhedged increases portfolio volatility and the range of potential outcomes, while hedging ensures greater parity with a U.S. investor’s local market.

Figure 5. Short-term interest rates can drive different FX hedge performances depending on the global rate environment



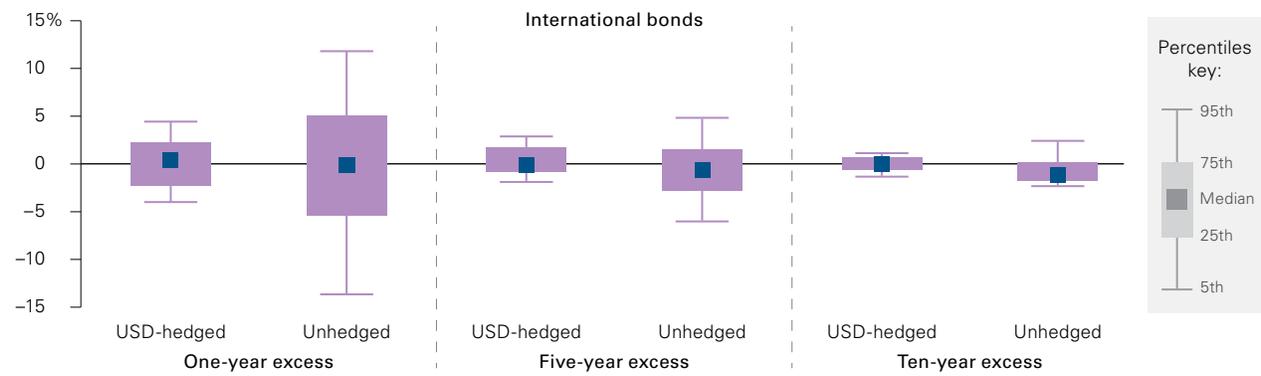
Source: Vanguard.

It is important for the U.S.-based investor to consider FX hedging's effects in practice as well as theory. **Figure 6a** shows the dispersion of excess total returns relative to U.S. bonds for both hedged and unhedged international bonds since 1990. **Figure 6b** shows their excess volatility over the same period.

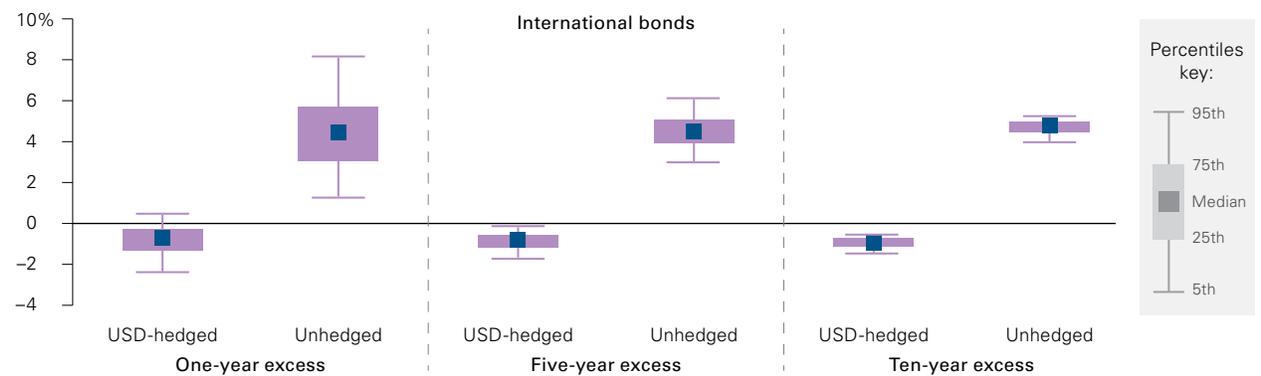
Hedged global bonds more closely resemble the return and volatility profile of U.S. bonds than do their unhedged counterparts. Although ten-year returns do begin to converge, unhedged bonds still show notable excess volatility.

Figure 6. In practice, hedged global bonds more closely resemble U.S. bonds in terms of total return and volatility

a. Distribution of annualized excess returns relative to U.S. bonds



b. Distribution of annualized excess volatility relative to U.S. bonds



Notes: U.S. bond total return and volatility are represented by the Bloomberg Barclays US Aggregate Bond Total Return USD Index, hedged global bonds are represented by the Bloomberg Barclays Global Aggregate Ex USD Total Return Hedged USD Index, and unhedged global bonds are represented by the Bloomberg Barclays Global Aggregate Ex USD Total Return USD Index. Data cover the period from January 1, 1990, to August 31, 2019.

Source: Vanguard calculations, using data from Morningstar.

Conclusion

Although the recent growth of negative-yielding debt across the globe has been thrust into the forefront of financial news, there is more to the story for the U.S.-based investor. International bonds make up nearly 60% of the \$57 trillion investment-grade fixed income market and encompass over 40 country exposures. For investors who choose to allocate a portion of their portfolio to international bonds, hedging foreign currency (FX) exposure helps maintain the risk profile of the fixed income security and dampen portfolio volatility.

FX hedging's effect on short-term performance depends on the global rate environment. Over a long period, investors should not expect to earn an excess return by being hedged or unhedged. Relative to their domestic market, they can only expect an excess return by assuming additional credit risk. All else being equal, hedged international fixed income gives U.S.-based investors the opportunity to include an asset class that can add diversification while maintaining similar returns over the long term.

References

- Chinn, Menzie D., and Saad Quayyum, 2012. *Long Horizon Uncovered Interest Rate Parity Re-Assessed*. NBER Working Paper No. 18482. Madison, Wis.: University of Wisconsin, Department of Economics; available at http://www.nber.org/papers/w18482.pdf?new_window=1.
- Roberts, Daren R., Paul M. Bosse, Scott J. Donaldson, and Matthew C. Tufano, 2018. *The Portfolio Currency-Hedging Decision, by Objective and Block by Block*. Valley Forge, Pa.: The Vanguard Group.
- Schlanger, Todd, David J. Walker, and Daren R. Roberts, 2018. *Going Global with Bonds: The Benefits of a More Global Fixed Income Allocation*. Valley Forge, Pa.: The Vanguard Group.
- Thomas, Charles J., and Paul M. Bosse, 2014. *Understanding the 'Hedge Return': The Impact of Currency Hedging in Foreign Bonds*. Valley Forge, Pa.: The Vanguard Group.

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