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RESEARCH BRIEF
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CURRENCY HEDGING FOR INVESTMENT IN DEVELOPED MARKETS

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International allocations are growing among institutional investors. However, the attendant (and possibly unintended) currency exposure may be unwanted or even uncompensated. Investors may consequently choose to hedge currency exposure. Investors can remove currency exposure via hedged investment vehicles or via an overlay. Forwards and futures can both be used to implement a currency overlay with modest liquidity requirements, low trading costs, and reasonable expected tracking error.

This paper focuses on U.S. investors with exposure to developed mark currency risk. For more information on currency exposure in emerging markets, consider reading: "Currency Hedging in the Emerging Markets: All Pain, No Gain," by Tim Atwill.

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CURRENCY HEDGING IN THE EMERGING MARKETS: ALL PAIN, NO GAIN

Investors in foreign equities are exposed to potential risks from both the movement of security prices and currency exchange rates. Over the past two years, the U.S. dollar has strengthened significantly against most developed and emerging market currencies, resulting in material performance headwinds for U.S. dollar-based investors. This, in turn, has led to a growing interest in hedging the effects of currency movements on developed international equity holdings. As a consequence, many investors also wonder if they should apply a similar program to their emerging market assets.

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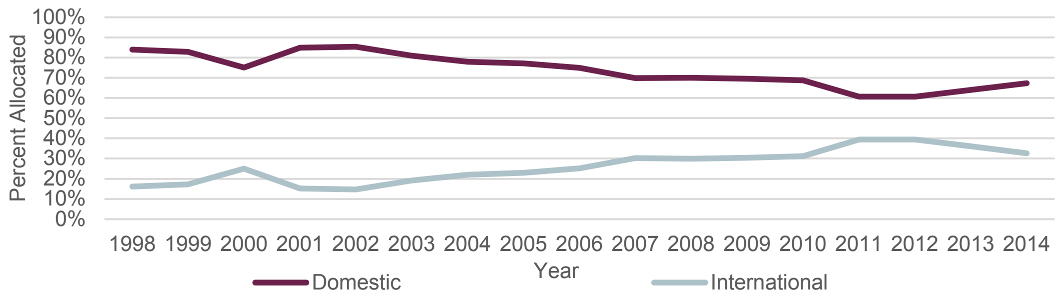
> "The gains from hedging are similar to the gains from international diversification. Because it reduces risk for both sides, currency hedging provides a 'free lunch.'"
>
> **- Fischer Black [1995]**

LONG- AND SHORT-TERM TRENDS IN INTERNATIONAL INVESTMENT

During the last half century, a significant amount of global equity market capitalization has shifted from the United States to international markets. As more nations join the developed world and globalization drives joint international economic growth, U.S. institutional investors will likely continue to increase their allocations to international equities and other assets.

Exhibit 1: U.S. Pension Fund Equity Allocations



Note: 17% of equity allocations have moved from domestic to international since 1998.
Source: Pensions & Investments, January 2014

Against the backdrop of this long-term trend, short-term concerns about economic performance in Europe and Asia combined with diverging interest rate policies between the United States and the European Union and Japan may have triggered a sharp appreciation in the U.S. dollar. This appreciation has reduced returns for U.S. investors with unhedged international investments.

CURRENCY RETURNS: UNCOMPENSATED RISK

For U.S. investors with allocations to developed international markets, unhedged currency exposure may have increased return volatility without necessarily improving long-term expected returns. The graph below illustrates the returns of the MSCI EAFE Index with currency exposure hedged and unhedged. The goal is to demonstrate the relationship between currency and equity returns over a complete market cycle. Currency exposure sometimes enhances returns and sometimes hinders them, but its effect largely cancels out over market cycles, leaving increased volatility as the lasting result.

Exhibit 2: Total Return Growth of a $1 Investment in MSCI EAFE and the Difference Between Hedged and Unhedged Growth

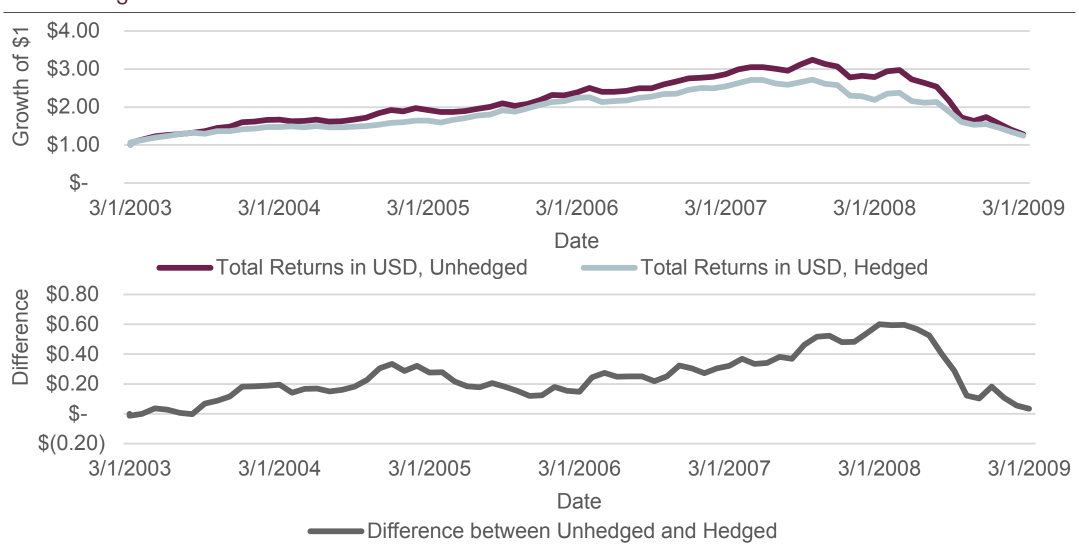


EXHIBIT 2 CONTINUED ON NEXT PAGE

EXHIBIT 2 CONTINUED FROM PREVIOUS PAGE

MSCI EAFE Total Return Index in USD	Annualized Standard Deviation 3/12/2003-3/9/2009	Annualized Return 3/12/2003-3/9/2009
Hedged	15.09%	3.78%
Unhedged	17.77%	4.23%

For informational purposes only. Cannot invest directly into indices.
Source: Parametric, Bloomberg, 3/6/2015

"Currency risk is fascinating because it is a by-product of international investing. Currency has no long-term expected return because, although it is a risk exposure, it is not an economic asset for which a long-term risk premium exists."

- Mark Anson [2014]

This pattern holds true over the long-term. Since 1990, hedged MSCI EAFE has exhibited 12% less volatility that unhedged MSCI EAFE.[1]

This result may seem counterintuitive at first glance. After all, equity and fixed income returns are largely uncorrelated with currency returns, which seems to suggest that currency exposure would introduce diversification benefits to the portfolio. However, currency exposure is additive, not diversifying by nature. In a fully invested portfolio, assets are 100% exposed to traditional asset classes (equities, fixed income, alternatives). When assets are invested internationally, currency risk beyond asset exposures is introduced, which means total risk exposure exceeds total portfolio value. Importantly, this does not introduce leverage. Rather, it creates two unique sources of return in a single allocation (see Dunegan [2012]).

Hedging currency risk may be of even greater importance to U.S. investors because the U.S. dollar serves as a reserve currency, a currency which tends to strengthen when world equity markets fall because it is perceived as a safe preserver of value. During these market downturns, other currencies may depreciate relative to the U.S. dollar, and U.S. investors with unhedged international currency exposure may face declines in both the equity markets and their international currencies.

As Campbell [2010] explains, "Currency risk management can be effective in reducing portfolio risk. For a portfolio of equities, full hedging provides a large reduction in volatility if the investor's base currency is a reserve currency."

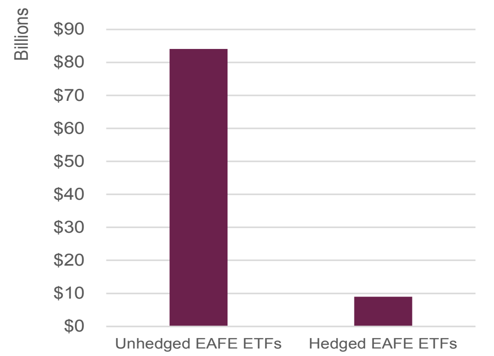
Consequently, the excess risk created by developed market currency exposure is often viewed as an uncompensated risk and garners little diversification benefit for U.S. investors. Funds that are dissatisfied with this thesis may therefore seek to eliminate some or all of the currency risk via a hedge.

▸▸ INVESTING IN HEDGED EQUITY PRODUCTS

U.S. investors have only recently begun to demand investment vehicles with currency hedging, particularly from global passive equity managers, and a handful of currency hedged index funds have emerged. In general, these funds have relatively short histories and have lower assets under management than their unhedged counterparts.

More concrete aggregate numbers are available for ETFs. Since 2011, Deutsche Asset and Wealth Management has built an array of currency hedged international equity exchange traded funds (ETFs). Wisdom Tree has also introduced its own currency hedged ETF line-up,

Exhibt 3: Assets Under Management for all MSCI EAFE Benchmarked ETFs



Source: Parametric, ETFDB.com, 3/31/15

[1] Parametric, Bloomberg, 4/10/15

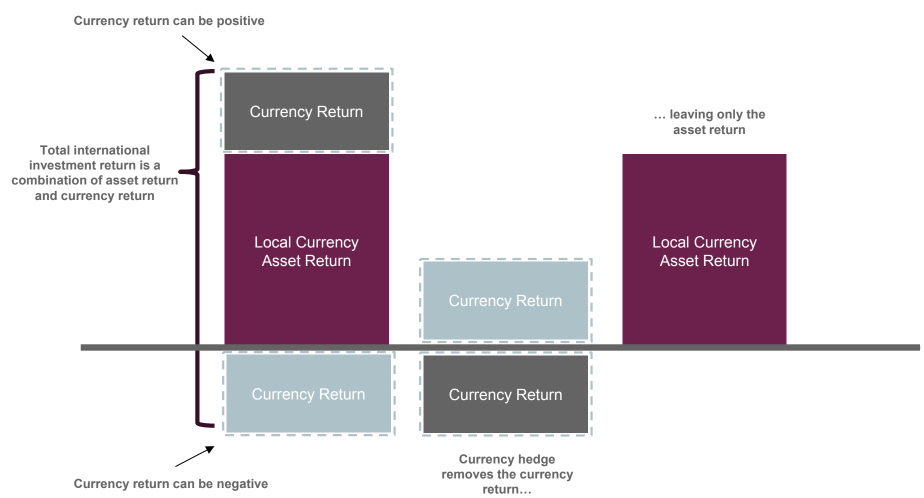
with 10 of their 12 funds opening in the last two years (see Lydon [2013]). However, these newly minted currency hedged vehicles offer neither the depth nor liquidity of their better-established non-hedged counterparts. iShares® MSCI EAFE ETF (EFA), the largest unhedged EAFE ETF, has eight times the assets under management of the MSCI EAFE Hedged Equity Fund (DBEF), the largest hedged EAFE ETF; EFA also enjoys nearly five times the trading volume.[2]

Investors who choose to manage currency exposure via their asset managers are likely to save themselves some operational challenges, but may be constrained in their selection by the small universe of international developed equity managers who currently provide currency hedged products. Investors in hedged products will still bear the expense of currency hedging and may incur higher management fees.

CURRENCY EXPOSURE OVERLAY INSTRUMENTS

A more common method of limiting currency exposure is to use a currency overlay program. The deep futures and forward currency markets allow investors to limit developed market currency exposure with precision and relatively little trading expense. To hedge the currency exposure of an international investment, investors need only sell synthetic exposure on the foreign currency with a notional exposure equivalent to the value of the international allocation to be hedged. This effectively eliminates the currency return embedded in the international investment, leaving only the intended asset (equity, fixed income, etc.) exposure.[3] Underlying investment decisions on style or sector are not altered.

Exhibit 4: Currency Hedging, the Basic Idea



For illustrative purposes only.

Over-the-counter forward currency trading has long been the more common vehicle for currency hedging. However, the Goldman Sachs [2015] sales and trading desk finds that currency futures have greatly increased in volume: "CME futures averaged $100 billion per day the last 5 years, compared to $65 billion the 5 years prior, and less than $15 billion the years before that. We estimate this activity is now near parity with EBS,[4] among the biggest electronic FX trading platforms, up from a ratio of 35% in prior years." Further, establishing forwards trading capabilities is likely to be more costly in terms of time and legal fees than establishing futures trading capabilities. While individual country currency forwards minimize tracking error, a basket of futures contracts can still provide an efficient hedge with fewer instruments and only a modest increase in tracking error.

[2] Source: ETFDB.com, 3/31/15. The difference in trading volumes also affects trading costs; DBEF is roughly twice as expensive to trade as EFA. (Source: Bloomberg, 3/16/15.)

[3] A long/short synthetic currency position will create exposure to three sources of return: spot currency return, foreign risk-free rate return, and domestic risk-free rate return.

[4] Electronic Broking Services (EBS) is a wholesale electronic trading platform used to trade foreign exchange with market making banks.

Exhibit 5: Optimized Currency Baskets

Currency	Forward Hedge	Futures Hedge
European Union Euro	30.45%	38.14%
Japanese Yen	21.15%	21.65%
United Kingdom Pound	20.97%	24.23%
Swiss Franc	9.39%	7.09%
Australian Dollar	7.44%	8.89%
Other Currencies	10.59%	- - -
Total	100.00%	100.00%
% Direct Index Currency Coverage	**100%**	**89.41%**
Expected Annual Tracking Error [5]	**0.10%**	**0.27%**
Expected Annualized Transaction Costs	**0.03%-0.05%**	**0.03%-0.05%**

Source: Goldman Sachs, Parametric, 4/7/15.

Both forwards and futures can be capital efficient vehicles. Currency forwards generally have no exchange of cash until the end of term or when the unrealized gain/loss exceeds a pre-determined threshold. However, because forwards are OTC instruments, they expose the investor to counterparty credit and trading risk. Currency futures generally require an initial margin of 2-3% of notional exposure plus some amount of variation margin. Positions are marked-to-market daily, which all but eliminates counterparty credit risk. An important distinction between the two vehicles is the customized nature of forwards versus the standardized nature of futures contracts. Where the terms (tenor, size, tradable currencies) of futures contracts are preset, forward contracts allow investors to hedge to their precise requirements. Futures contracts are highly liquid and trade nearly around the clock, meaning that positions can be quickly and efficiently adjusted to changes in policy or market conditions with minimal trading costs. Forward contracts are also very liquid, but more customized terms or less commonly traded currency pairs may make trading more difficult.

WHEN AND WHAT TO HEDGE

The flexibility of synthetic instruments allows investors to customize their currency hedge to suit unique objectives. Some investors may choose to eliminate currency risk from their portfolios as a matter of investment policy. In such a case, an ongoing hedging program can synthetically remove currency exposure from the target set of assets. Other investors may use currency hedging to capitalize on their near-term views of upcoming currency performance on a currency basket or individual currency basis. For example, U.S. investors concerned about the economic outlook for the European Union may choose to hedge only Euro exposure and leave exposure to other currencies intact.

Investors should know all of the potential benefits and risks of currency hedging:

Benefits

- Remove risk associated with developed market currency exposure
- Risk managed with modest capital requirements
- Expanded universe of potential investments
- Relatively tight tracking error and low trading costs

[5] Estimated Annual Tracking Error is calculated based on forward looking estimates.

Risks

The risks of currency hedging reflect the risks common to most derivatives-based risk management strategies.

- Market: currency markets could perform in a way that was not anticipated
- Leverage: if investors allow the notional value of their currency hedge to exceed the value of their international positions, they may introduce unwanted leverage into the portfolio
- Tracking error: currencies that are not incorporated in the hedge may exhibit volatility that introduces tracking error; additionally, forward rates move differently than spot rates
- Liquidity: currency markets may move far enough against the hedge to trigger a margin call, in which case investors may need to raise liquidity or close positions
- Counterparty: for forward-based currency hedging, investors are exposed to the possibility that counterparties will default on their obligations; futures-based programs face clearing exchange credit risk

▸▸ CONCLUSION

In light of long-standing empirical evidence and recent economic developments, U.S. institutional investors may choose to manage developed market currency risk either tactically or as a matter of long-term policy. Some asset managers are beginning to offer currency hedged vehicles, but the more common method is still to hedge via a currency overlay program. Either futures or forwards can be used for execution with modest liquidity requirements, low trading costs, and reasonable expected tracking error. Investors should carefully consider all the benefits and risks of a synthetic currency hedging strategy to find which programs and vehicles best meet their needs.

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