

**WisdomTree
RESEARCH**

**DON'T LAYER CURRENCY
RISK ON TOP OF EQUITY
EXPOSURE**

**Co-authored by: JEREMY SCHWARTZ [CFA[®], Director of Research]
CHRISTOPHER GANNATTI [CFA[®], Associate Director of Research]**



When investors buy overseas assets, they have to sell U.S. dollars and buy euros or yen to purchase those overseas stocks. Unless a currency (foreign exchange, "FX") hedge¹ is made to mitigate this FX risk², investors are fully exposed to FX fluctuations.

Recently, currency-hedged equities have gained traction as a way to neutralize the FX risk and target local stock market returns. However, in many cases the baseline view is that currency hedging developed international equities is a tactical³ decision.

When it comes to developed world international fixed income, it is more often the standard that currency hedging is the baseline allocation. The rationale is that currency risk dominates fixed income volatility, so of course, the thinking goes, one should be hedged there.

But when it comes to equities, investors have rationalized that the currency risk embedded in international equity risk—due to higher volatility of equities—may not matter as much and perhaps washes out in the long run.

HOW WISDOMTREE THINKS ABOUT FOREIGN CURRENCY EXPOSURE

Taking currency exposure became the ubiquitous "status quo" for investors who were adding international equities to their portfolios. Simple, low-cost alternatives that allowed investors to control this risk did not even exist 10 years ago. One important consequence of this reality was that benchmarks tended to include the risk of currency fluctuations against the U.S. dollar.

Now, simple alternatives that allow investors of all shapes and sizes to mitigate the risk of currency are everywhere. To us, the most important resulting impact is that currency can now be viewed as much more of a choice in constructing portfolios. In our opinion, the only thing that matters is that return potential is maximized while controlling for risk.

Does currency exposure compensate for the potential risk that it adds to the picture? If the answer is yes, great, it makes sense to hold currency exposure. If the answer is no, then it does not make sense to retain the exposure. For those concerned about benchmarks, we certainly recognize that these decisions are not to be taken lightly, but there is also no reason international equity benchmarks MUST have currency risk built in. For instance, there are four versions of the MSCI EAFE Index: one that includes the foreign currencies (the U.S. dollar version), one that measures the return in local currency (no FX risk), one that includes hedges on top of a U.S. dollar version and one that includes an adaptive hedge ratio.⁴ All of these are reasonable gauges of the performance to international markets, and the choice of a strategic⁵ benchmark dictates what hedging decision is a so-called active bet⁶ versus that benchmark.

¹ Hedge: Apply strategies meant to mitigate the impact of currency movements on equity returns. Hedging can help returns when a foreign currency depreciates against the U.S. dollar, but it can hurt when the foreign currency appreciates against the U.S. dollar.

² Risk: Also 'standard deviation,' which measures the spread of actual returns around an average return over a specific period. Higher risk indicates greater potential for returns to be farther away from this average.

³ Tactical: Framework for looking at markets and investment decisions for shorter-term time horizons.

⁴ Hedge ratio: Refers to the percent of currency risk that a strategy is seeking to mitigate at a particular point in time.

⁵ Strategic: Framework for looking at markets and investment decisions for longer-term time horizons.

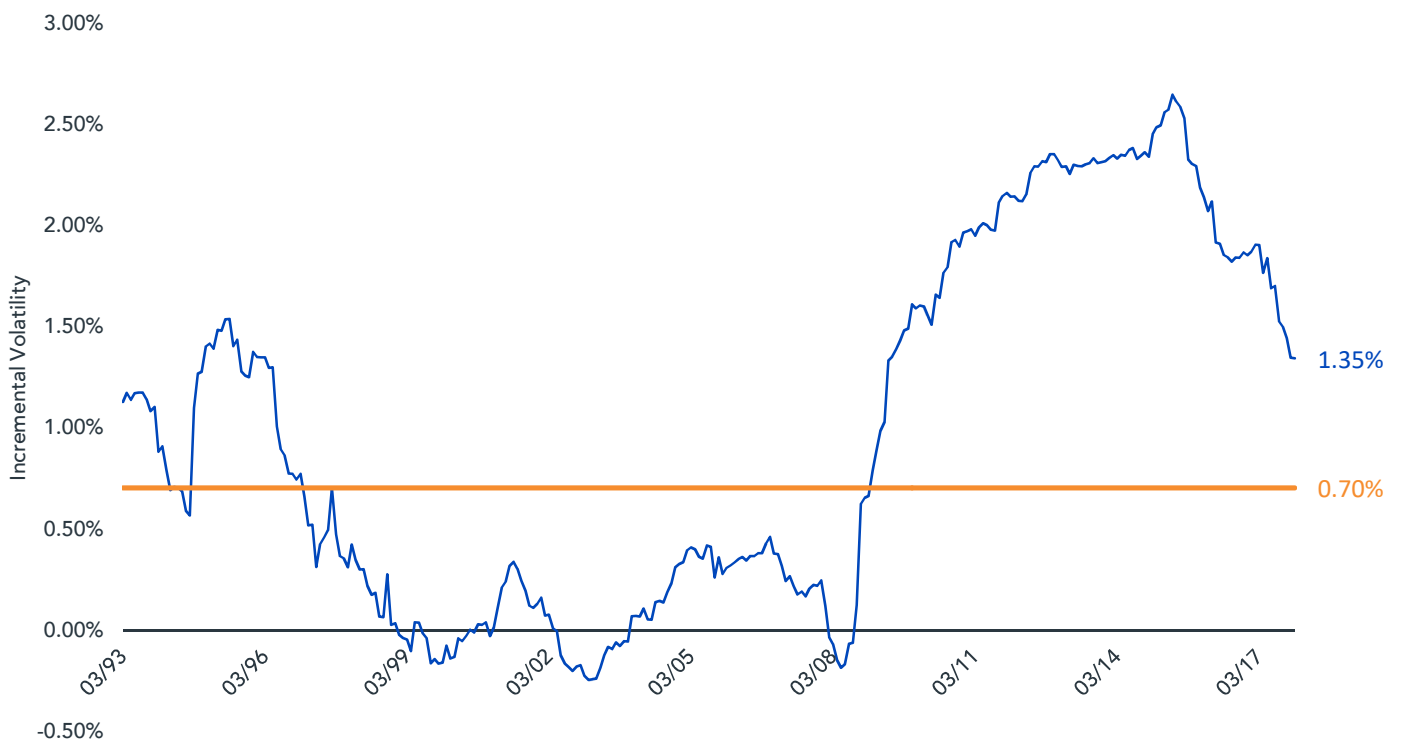
⁶ Active bet: Funds that attempt to outperform the market by selecting securities a portfolio manager believes to be the best.

THE STRATEGIC CASE FOR CURRENCY HEDGING – COMPENSATED OR UNCOMPENSATED RISK?

Many investors aren't looking to time the market or operate extremely tactical portfolios, but rather to construct asset allocations that have the potential to withstand the rigors of a more complete market cycle, typically three to seven years in duration.

Within that context, a phrase we hear often is that "currency exposure increases diversification⁷." But does adding currency risk lower overall portfolio volatility over time for U.S. investors?

FIGURE 1: SEVEN-YEAR CASE STUDY OF INCREMENTAL RISK OF CURRENCY EXPOSURE



Sources: WisdomTree, MSCI, with data for the MSCI World Index universe from 3/31/1986 to 12/31/2017, with period reflecting live calculation period for the MSCI World Index. You cannot invest directly in an index. Past performance is not indicative of future results.

Figure 1 examines the difference in average annual volatility⁸ over seven-year periods when taking versus not taking exposure to currency risk. The median⁹ average annual increase in volatility coming from currency risk was 0.70%. In more recent rolling seven-year periods, currency has been adding more risk than it has typically done historically. It's also clear that there really aren't many periods where currency exposure actually served to be a large diversifier and reduced risk.

⁷ Diversification: Concept of holding different assets in a combination that has the potential to reduce the overall risk of the combination below that of the individual components.

⁸ Volatility: A measure of the dispersion of actual returns around a particular average level.

⁹ Median: The value within a dataset at which 50% of all observations occur above and 50% occur below.

DOES CURRENCY REDUCE VOLATILITY OF MSCI WORLD INDEX?

As of December 31, 2017, the MSCI World Index had about 60% exposure to U.S. equities. What we see in figure 1 indicates to us a globally diversified mix of 60% U.S. equities and 40% developed international equities. Two things to note: 1) it has been rare to find periods where currency actually reduced risk over the seven-year rolling periods, and 2) the recent picture has indicated some of the greatest incremental additional risk that has been seen from currency exposure over the measurable history.

FIGURE 2: WHAT ABOUT ROLLING PERIODS OF DIFFERENT LENGTHS?

Rolling Periods	Number of Periods Currency Reduced Volatility	Total Number of Periods	% of Periods Currency Risk Reduced Volatility	Median Incremental Volatility of Currency Risk	Latest Incremental Risk of Currency Risk
3-Year	66	346	19.08%	0.70%	0.43%
5-Year	44	322	13.66%	0.79%	0.74%
7-Year	44	298	14.77%	0.71%	1.35%
10-Year	16	262	6.11%	0.72%	2.01%
20-Year	0	142	0.00%	0.94%	1.15%
Maximum Period	0	1	0.00%		0.97%

WisdomTree, MSCI. Maximum period: 3/31/1986– 12/31/2017, the maximum live calculation history of the MSCI World Index. You cannot invest directly in an index. Past performance is not indicative of future results.

We performed the same analysis illustrated in figure 1 and summarized the results in a table for different rolling periods. The three-year period saw the greatest instance of currency exposure reducing volatility for the MSCI World Index—and this was at a frequency of slightly above 19%. Over the seven-year to 20-year periods, it is notable that the median incremental risk from currency was below that of the most recent rolling period. This tells us that we're in a period in which currency is adding a much greater degree of risk than we've seen historically.

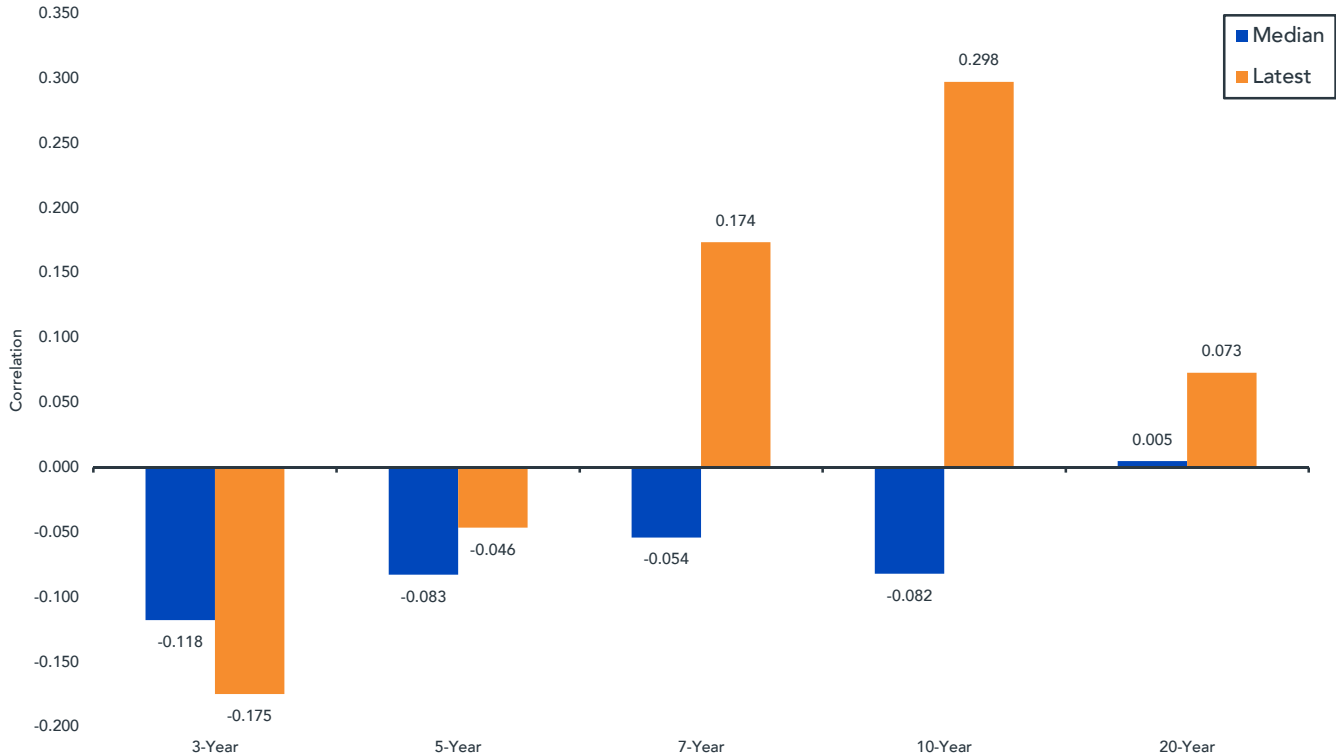
ACCOUNTING FOR THE RISK THAT CURRENCY EXPOSURE ADDS

One of the major motivations we have at WisdomTree is helping people fully and transparently understand what currency exposure in international equities actually contributes to a portfolio. To do this, it is essential to understand exactly what determines how much risk of currency actually carries through to the combined currency and equity exposure. Below, we utilize the MSCI EAFE Index universe and look at the transmission mechanism that is responsible for carrying through the risk of currency exposure into the combined experience of currency and equity. The bottom line:

- + If correlation¹⁰ between the equities of a particular market or universe and the currency exposure of that universe is rising, more risk will be carried through to the combined portfolio.
- + If correlation between the equities of a particular market or universe and the currency exposure of that universe is falling, less risk will be carried through to the combined portfolio.

¹⁰ Correlation: Statistical measure of how two sets of returns move in relation to each other. Correlation coefficients range from -1 to 1. A correlation of 1 means the two subjects of analysis move in lockstep with each other. A correlation of -1 means the two subjects of analysis have moved in exactly opposite directions.

FIGURE 3: WHY HAS CURRENCY EXPOSURE BEEN ADDING RISK RECENTLY?



Sources: WisdomTree, MSCI, with data for the period from 3/31/1986 to 12/31/2017, the full period of live history for the MSCI EAFE Index universe. The median values reflect the full amount of 3-year, 5-year, 7-year, 10-year and 20-year respective periods. Latest refers to the value of these respective correlations as of 12/31/2017, the most recent value. You cannot invest directly in an index. Past performance is not indicative of future results.

CORRELATIONS OF EQUITIES AND CURRENCY NOT SUFFICIENTLY NEGATIVE TO REDUCE RISK

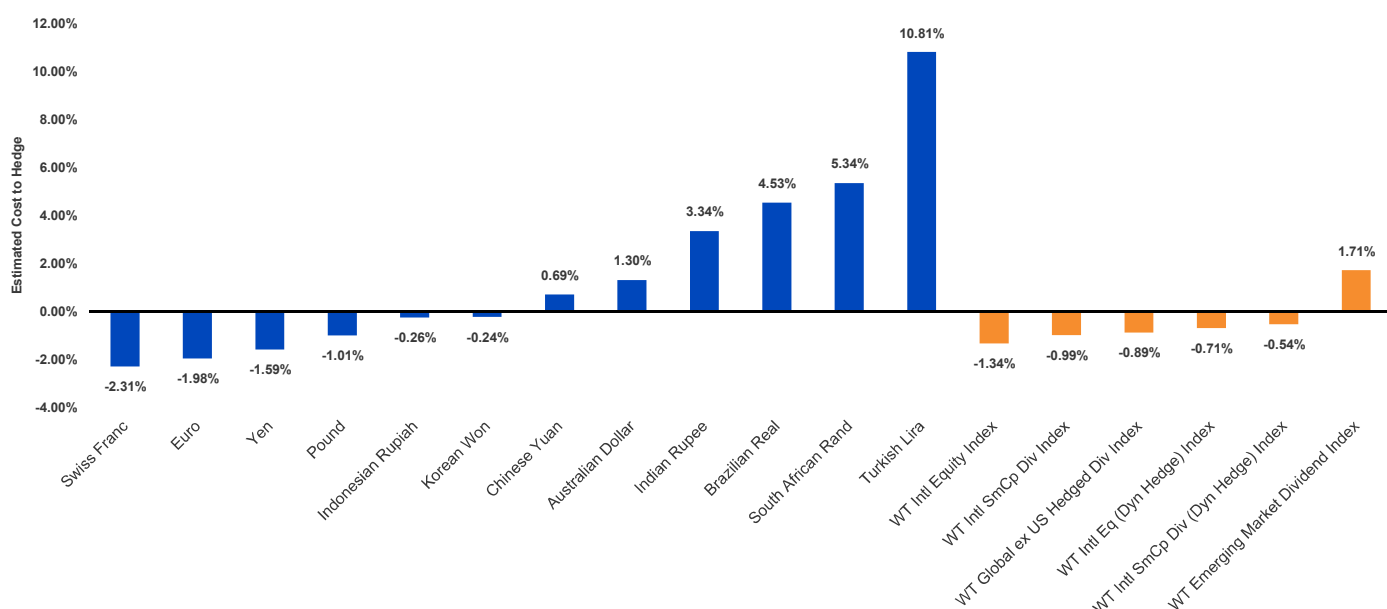
While the three-year and five-year picture is fairly close, what we see on a 7-year, 10-year and 20-year basis is that the most recent rolling period correlations between equity and currency are much higher than the median, meaning correlations have generally been rising. That means the volatility of the currency—which tends to be fairly stable across time at 5% to 10% per year—will see a greater amount of transmission into the combined exposure of equities and currencies for this universe. It's also worth noting that, to see a lower risk level from taking the currency exposure, one would need to see a correlation value of approximately -0.30 or lower, and very few developed world currencies—outside the yen—are that persistently negatively correlated to their equity markets. We therefore doubt that currencies are really an effective diversifier to reduce risk—for U.S. investors.

"CURRENCY HEDGING MUST BE EXPENSIVE"

The idea that currency hedging is expensive has been a common refrain. Many times when people see the word "hedging" it references a complex strategy that adds significantly to cost but not necessarily to returns. To take away some of the mystery and try to bring transparency to the concept:

1. One direct cost is the trading commission paid on currency instruments. We have estimated that the cost to trade our currency hedges—which are implemented monthly—runs 2 to 3 basis points¹¹ per year.¹² The currency trading team emphasizes that currencies are the most liquid instruments in the world, and the bid/ask spreads¹³ of these markets are tight enough to make trading costs a nonfactor in our minds.
2. A more important cost of hedging is based on interest rate differentials. We see in figure 4 that this can be a valid concern in some countries today: Brazil, India, Turkey and South Africa, for example. These are all countries that have very high short-term interest rates when measured against U.S. interest rates. We'd agree that the case to hedge these emerging market currencies is diminished, as these currencies have to depreciate more for the hedge to pay off.

FIGURE 4: COST OF HEDGING CURRENCY WITH 1-MONTH FORWARDS PRIMARILY BASED ON INTEREST RATE DIFFERENTIALS [Trailing 12-Month Ending 12/31/2017]



Sources: WisdomTree, Bloomberg, with data as of 12/31/2017. The WisdomTree International Hedged Quality Dividend Growth Index was formerly the WisdomTree International Hedged Dividend Growth Index, and the WisdomTree International Equity Index was formerly the WisdomTree DEFA Index. You cannot invest directly in an index. Past performance is not indicative of future results.

¹¹ Basis points: 1/100th of 1 percentage point.

¹² Source: Bank of New York Mellon with data as of 12/31/2017

¹³ Bid/ask spreads: This is essentially the difference between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it.

BEING PAID TO HEDGE, ESPECIALLY EURO AND YEN

But figure 4 also shows that the cost to hedge developed world currencies, such as the euro and the yen, has been brought down to virtually zero because all of their interest rates are pegged near zero. This environment makes currency hedging particularly relevant in the developed world today because investors are starting to get paid the interest rate differentials of higher rates in the U.S. to put on the currency hedge.

Now we're starting to see a picture where currency exposure adds risk on a fairly consistent basis. We also have seen that currency exposure has added greater risk recently than it has historically when looking at different frequencies of rolling periods.

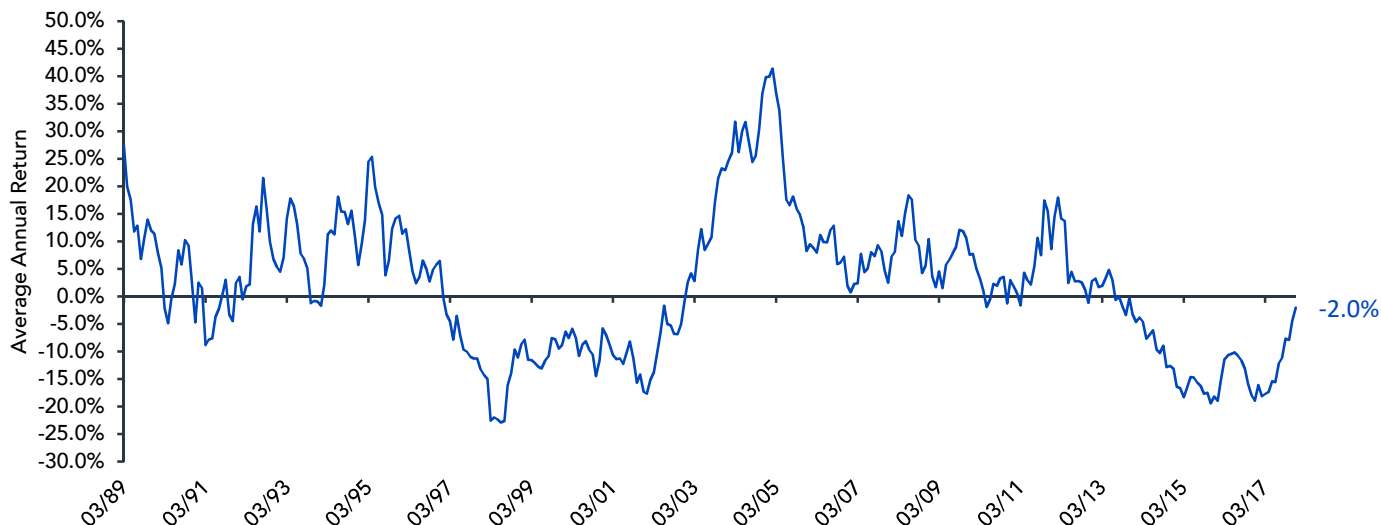
If currency exposure can be hedged at either zero cost or at a net benefit (meaning the U.S. interest rate is higher than that of the euro, yen or Swiss franc), thereby giving the potential to lower portfolio risk, the question begins to shift to one of why not hedge currency exposure rather than why hedge it.

REALITY CHECK FOR UNHEDGED BENCHMARKS (U.S. DOLLAR BEARS)

When investors take on a fully unhedged exposure or utilize a fully unhedged benchmark, they are making a bet. The bet they're making is that the U.S. dollar will depreciate and that it is, for whatever reason, worthwhile to assume the risk of currency. We've touched on the risk that currency has added in figures 1 and 2. Figure 5 shows the historical three-year cumulative impact that currency has had on the MSCI EAFE Index for U.S. investors. This is the additional exposure from FX an investor gets unless that FX risk is hedged. Figure 5 shows clearly that FX can enhance or drag down returns significantly. There was a three-year period when FX added more than 40% cumulatively to the returns of the MSCI EAFE. But there also have been times when FX subtracted more than 20% cumulatively on a three-year basis.

This additional return component has gone from a fairly large booster in the late 2000s to a drag in the more recent periods.

The critical point is that the dollar has moved in waves, and we think that will continue to be the case. Given the higher volatility that comes with foreign currencies, one should have a high conviction these currencies will appreciate in value in order to compensate for the higher risk.

FIGURE 5: JUDGING THE 3-YEAR CUMULATIVE IMPACT OF CURRENCY ON MSCI EAFE INDEX RETURNS

Sources: WisdomTree, MSCI, 3/31/1986–12/31/2017. Past performance is not indicative of future results. You cannot invest directly in an index.

CURRENCY HEDGING AS STRATEGIC ALLOCATION \neq CURRENCY BET

WisdomTree was not the first to argue that currency hedging should be considered more as a strategic baseline. In their 1988 paper, "The Free Lunch in Currency Hedging: Implications for Investment Policy and Performance Standards," Andre F. Perold and Evan C. Shulman wrote:

In this article we argue that it is better to formulate long-run investment policy in terms of hedged portfolios than unhedged portfolios. The key to our argument is that, from the perspective of long-run policy, investors should think of currency hedging as having zero expected return. Therein lies the free lunch. On average, currency hedging gives you substantial risk reduction at no loss of expected return. Our prescription does not say the prescient investor should not selectively lift a hedge, just that hedging should be the policy, and lifting the hedge an active investment decision.¹⁴

Further, Perold and Shulman responded to a common argument—that if you hedge your currency risk and these foreign currencies appreciate, there is an opportunity cost from not having that foreign currency. Perold and Shulman retort:

The same can be said about avoiding any other kind of risk, however. For example, consider another strategy, roulette, which like currency risk, has a low correlation with other assets. Not playing roulette also has opportunity costs: There is always the "risk" that your number comes up and you miss out. Avoiding currency risk by hedging is much like avoiding roulette by not playing.¹⁵

¹⁴ Andre F. Perold and Evan C. Schulman, "The Free Lunch in Currency Hedging: Implications for Investment Policy and Performance Standards," *Financial Analysts Journal*, May–June 1988.

¹⁵ Andre F. Perold and Evan C. Schulman, "The Free Lunch in Currency Hedging: Implications for Investment Policy and Performance Standards," *Financial Analysts Journal*, May–June 1988.

Also framing currency risk through this gambling lens was Steve Scoles, who wrote the following in the paper "Currency Risk: To Hedge or Not to Hedge - Is That The Question?":

My view is that currency risk should almost always be hedged. Instead of asking whether to hedge or not, the questions that should be asked are: "To make a bet or not to make a best?" and "Do we truly have the ability to predict currency movements?"¹⁶

Scoles starts his paper by discussing the Kelly formula—a strategy for betting that maximized the bettor's bankroll and that was devised by an AT&T Bell Labs scientist. Scoles wrote:

Fraction of bankroll to wager = $2p - 1$, (where p = probability of winning).

- + For example, let's say you are betting on a fair coin flip. Whether you pick heads or tails, your probability of winning is 50%. In this bet, the Kelly formula would say to wager nothing: $2 \times 50\% - 1 = 0\%$
- + If it was an unfair coin such that heads comes up 60% of the time, the Kelly formula says to wager 20% of your bankroll on heads: $2 \times 60\% - 1 = 20\%$
- + And if the coin always comes up heads, you should wager 100% of your bankroll: $2 \times 100\% - 1 = 100\%$

The main idea of the formula is that the size of your bet should be a function of how large your edge or advantage is. ... The formula forces you to think about whether you truly have an edge in a proposition and to focus only on situations where you do have an edge.¹⁷

The question then becomes: Do you have an edge and the ability to predict currency moves with meaningful accuracy?

If you do not, then should you default to always taking on the currency risk unhedged—as is the most common default in allocations today?

If you do have foresight, then it could be worthwhile to wager on currencies and add in the risk when it looks desirable to do so. But again, if you have no edge in predicting when to add in currency return, the Kelly formula would suggest not making this unnecessary bet. Simply put, it would argue for strategic hedging always (assuming it is a free option, as it is in the developed world).¹⁸

¹⁶ Steve Scoles, "Currency Risk: To Hedge or Not to Hedge—Is That the Question?" Risks and Rewards: Society of Actuaries, February 2008 (Issue 51).

¹⁷ Steve Scoles, "Currency Risk: To Hedge or Not to Hedge—Is That the Question?" Risks and Rewards: Society of Actuaries, February 2008 (Issue 51).

¹⁸ Source: Bloomberg. Refers to the annualized differences in short-term interest rates shown in figure 3 between the U.S. and the UK, Swiss, eurozone and Japanese markets, as of 12/31/2017.

WHAT ABOUT DIVERSIFICATION?

Does FX provide a level of diversification not offered by the local equity markets? We've already reviewed the case of the MSCI World Index. Let's now review the case for allocating to EAFE FX as a stand-alone investment in the MSCI EAFE Index universe:

- + Over the history of the MSCI EAFE Index, EAFE FX has added about 1% annually to the returns of the MSCI EAFE Index. This means the U.S. dollar declined by about 1% per year over this period.
- + How much is 1% per year? It is associated with a negative Sharpe ratio¹⁹. That means the 1% per year was not enough to outpace the risk-free rate²⁰ for a U.S. investor over this period of approximately 30 years.
- + This return stream of EAFE FX had an annualized volatility of about 8% per year, a little more than half the volatility of EAFE equities (in local currencies—shown in figure 6 as EAFE no FX).
- + The correlation of EAFE FX to the S&P 500 over the full period was fairly low—less than 0.10. But note a very important correlation trend: This EAFE FX correlation to the S&P 500 has been higher in more recent periods. In the last three years, the correlation between EAFE FX and the S&P 500 was about 0.20, so EAFE FX is not providing the same type of diversification as it did historically, when being considered as an asset looking to diversify the risk of the S&P 500 Index.

More importantly, one has to wonder if the past gain in EAFE FX can be repeated. We know with hindsight that the U.S. dollar declined. But do we know the U.S. dollar will decline going forward? Theoretical models suggest that there is no expected return to owning currency. So why would an investor want to take on this FX risk embedded in foreign equity exposure—unless that investor is a tactical U.S. dollar bear?

The correlation to the S&P 500 for EAFE with FX and EAFE with no FX shows minimal differentials over the last 3-year, 5-year, 10-year and 20-year periods. There is a slightly lower correlation to EAFE with FX over the full period, but that does not appear to be a compelling case to add currency exposure on top of the local equity market return, given the uptick in total volatility from adding FX and the unpredictability of future currency moves.

We struggle to understand the rationale to take on EAFE FX risk, given the volatility profile, the rising correlation to the S&P 500, the lack of return expectations from FX investing and the very low cost of hedging these currencies today.

¹⁹ Sharpe ratio: Measure of risk-adjusted return. Higher values indicate greater return per unit of risk, specifically standard deviation, which is viewed as being desirable.

²⁰ Risk-free rate: Typically an interest rate on a bond issued by a government entity, where the risk of default is so small as to be deemed nonexistent.

FIGURE 6: DOES EAFE FX LOOK INTERESTING AS A STAND-ALONE ASSET CLASS?

Period	Returns			Volatility Levels				Sharpe Ratio			Correlations to S&P 500		
	EAFE w/ FX	EAFE no FX	EAFE FX	EAFE w/ FX	EAFE no FX	EAFE FX	S&P 500	EAFE w/ FX	EAFE no FX	S&P 500	EAFE w/ FX	EAFE no FX	EAFE FX
3/31/86-12/31/17	6.9%	5.7%	1.1%	17.1%	14.9%	8.3%	14.9%	0.21	0.17	0.48	0.69	0.75	0.07
3-Year	7.8%	8.5%	-0.7%	12.0%	11.4%	6.3%	10.1%	0.62	0.72	1.10	0.82	0.77	0.18
5-Year	7.9%	11.4%	-3.2%	11.7%	10.3%	5.9%	9.5%	0.66	1.09	1.64	0.79	0.78	0.19
10-Year	1.9%	3.3%	-1.3%	18.5%	14.9%	7.6%	15.1%	0.09	0.20	0.54	0.89	0.88	0.46
20-year	5.2%	4.7%	0.5%	16.6%	14.4%	7.3%	14.9%	0.20	0.19	0.36	0.86	0.85	0.26

Sources: WisdomTree, MSCI, Kenneth French Data Library, 3/31/1986–12/31/2017. Start date reflects the start of the live calculation for the MSCI EAFE Index. EAFE w/ FX refers to the MSCI EAFE Index priced in U.S. dollars. EAFE no FX refers to the MSCI EAFE Index priced in the local currency. EAFE FX refers to the underlying currency exposure in the MSCI EAFE Index. Past performance is not indicative of future results. You cannot invest directly in an index.

Framing the data in a slightly different way in figure 7, one of the noticeable attributes of EAFE FX is how the volatility compared to its local equity market has increased dramatically in recent years. While the full period and 20-year correlations were close to zero, the correlation over the last 10 years was about 0.30.

These correlation regimes can change, but what is important—even when there was close to zero correlation between EAFE FX and EAFE equities expressed in local currency terms over the full period of available data, as well as over the past 20 years—is that currency risk still increased the volatility of EAFE by around 2.0% depending on the period.

The increasing correlation is the mechanism through which more of the volatility of embedded EAFE currency exposure gets transferred into the volatility of MSCI EAFE in U.S. dollars (unhedged). For instance, it's interesting in figure 7 how the average annual risk of the currency was lower in the ten-year period than the full period when viewed on its own, but due to the rising correlation over this period, it saw the greatest transfer through to the combined exposure of the three periods shown.

FIGURE 7: HOW CURRENCY EXPOSURE CAN IMPACT VOLATILITY

Period	Volatility of MSCI EAFE in U.S. dollars (unhedged)	Volatility of MSCI EAFE expressed in local currency terms	Volatility of embedded EAFE currency exposure	Volatility increase attributable to currency	Correlation between currency and equity expressed in local terms
Full Period	17.1%	14.9%	8.3%	2.2%	0.00
Last 20-Years	16.6%	14.4%	7.3%	2.2%	0.07
Last 10-Years	18.5%	14.9%	7.6%	3.6%	0.30

Correlation between currency and equity expressed in local terms: Correlation between EAFE FX returns and the MSCI EAFE equity returns that are expressed in local currency terms. Sources: MSCI, for period from 3/31/1986–12/31/2017. Concept for chart comes from "Managing Currency Risk," Record Currency Management, March 2015. You cannot invest directly in an index. Past performance is not indicative of future results.

ASSET LIABILITY MANAGEMENT

Steve Scoles made a further important point about the supposed diversification benefit of "the uncorrelated risk" when applied to insurance companies and pension funds that have liabilities²¹ in a certain currency:

The idea that uncorrelated risk is good comes from the mean-variance framework of modern portfolio theory. In the context of looking at only assets, that may be fine. However, it is important to remember that insurance companies and pension plans are highly leveraged propositions. Our long-term guarantees to policyholders and plan members require us to measure risk vis-à-vis the liabilities rather than simply looking at the assets. That is, asset value fluctuations are not important as long as the liability value fluctuates in the same way. In this asset-liability context, currency risk adds to the overall risk rather than reduces it.²²

We agree, and what is true for the pension fund that owes liabilities to retirees in a certain currency is also true for an individual investor who is consuming goods in a certain currency. Unless U.S. investors believe that a significant amount of their future consumption will be in euros—say, if they have a house in the French Riviera—then euro exposure adds unnecessary volatility to their future consumption profile.

DECLINING DIVERSIFICATION OF OWNING THE EURO

Figures 8 and 9 illustrate the same charts for the European Monetary Union (EMU) FX²³ that we showed in figures 6 and 7 for EAFE FX.

The bottom line is that we're seeing a similar case of what we saw for EAFE FX, namely: 1) flat to negative returns for EMU FX; 2) average annual volatility for EMU FX of about 10%; and 3) declining diversification benefit from exposure to EMU FX. Specifically:

- + The EMU FX as a stand-alone asset class historically had an approximately 10% volatility consistently over most major periods—again, just about half the volatility of the local equity market.
- + The long-term returns to the MSCI EMU Index currencies were about 0.5% per year. That means the risk-return trade-off for European currencies as a stand-alone asset class showed relatively miniscule historical returns with large volatility (a bad combination).
- + EMU FX over the long run had a correlation of about 0.3 versus the S&P 500, but that has risen as high as 0.5 in recent periods. This rising correlation means there has been less diversification benefit to owning the euro.
- + While the EMU FX had actually a low correlation to the MSCI EMU stocks over the full history (shown in figure 9), even over that period, the EMU FX increased the risk by about 3 percentage points when packaged with the MSCI EMU equities. With the rising correlation in more recent periods, there has been increased volatility associated with currency risk.

²¹ Liabilities: Future streams of payments that will be owed in accordance with previously stated policy parameters.

²² Steve Scoles, "Currency Risk: To Hedge or Not to Hedge—Is That the Question?" Risks and Rewards: Society of Actuaries, February 2008 (Issue 51).

²³ Refers to the currency exposure of the MSCI EMU Index universe, measured against the U.S. dollar.

FIGURE 8: DOES EMU FX LOOK INTERESTING AS A STAND-ALONE ASSET CLASS?

Period	Returns			Volatility Levels				Sharpe Ratio			Correlations to S&P 500		
	EMU w/ FX	EMU no FX	EMU FX	EMU w/ FX	EMU no FX	EMU FX	S&P 500	EMU w/ FX	EMU no FX	S&P 500	EMU w/ FX	EMU no FX	EMU FX
Maximum Period	4.08%	3.58%	0.48%	21.11%	18.07%	9.97%	14.89%	0.11	0.10	0.32	0.82	0.81	0.27
3-Year	8.56%	8.87%	-0.29%	14.01%	14.59%	8.61%	10.07%	0.59	0.59	1.10	0.73	0.61	0.15
5-Year	8.61%	10.68%	-1.87%	14.60%	13.11%	7.96%	9.49%	0.58	0.80	1.64	0.72	0.64	0.25
10-Year	-0.05%	1.94%	-1.96%	23.42%	17.85%	10.92%	15.08%	-0.01	0.09	0.54	0.86	0.84	0.51
15-Year	7.75%	6.80%	0.90%	20.79%	16.19%	10.06%	13.26%	0.32	0.35	0.66	0.86	0.82	0.46

Sources: WisdomTree, MSCI, 4/30/1998–12/31/2017, which corresponds to the start of live calculation for the MSCI EMU Index. You cannot invest directly in an index. Past performance is not indicative of future results.

FIGURE 9: HOW CURRENCY EXPOSURE CAN IMPACT VOLATILITY

Period	Volatility of MSCI EMU in U.S. dollars (unhedged)	Volatility of MSCI EMU expressed in local currency terms	Volatility of embedded EMU currency exposure	Volatility increase attributable to currency	Correlation between currency and equity expressed in local terms
Maximum Period	21.11%	18.07%	9.97%	3.03%	0.06
Last 10 Years	23.42%	17.85%	10.92%	5.58%	0.31

Correlation between currency and equity expressed in local terms: Correlation between EMU FX returns and MSCI EMU equity returns that are expressed in local currency terms. Sources: WisdomTree, MSCI, data from 4/30/1998–12/31/2017. Chart concept comes from "Managing Currency Risk," Record Currency Management, March 2015. You cannot invest directly in an index. Past performance is not indicative of future results.

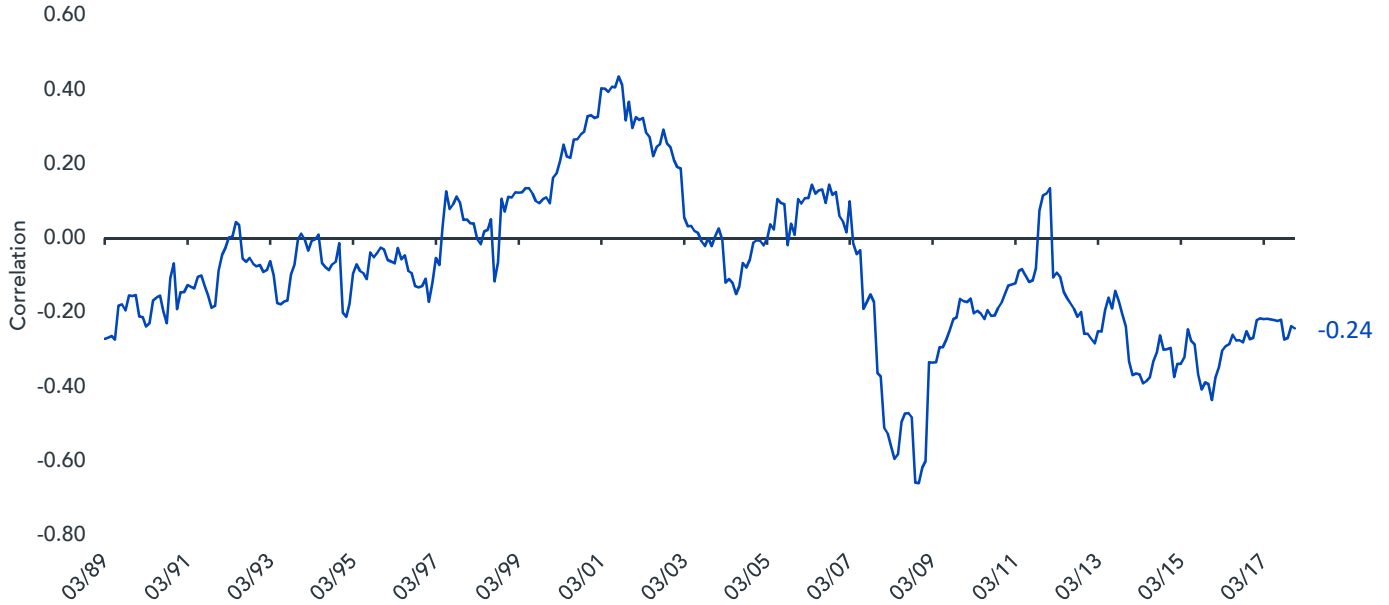
DO YOU REALLY WANT TO OWN YEN WITH JAPAN EQUITIES AS A DIVERSIFER?

The Japanese yen, evaluated on a stand-alone basis, looks like an interesting asset class to diversify S&P 500 exposure, as the yen displays a negative correlation to the S&P 500 over the approximately 30 years of data and a sharper negative correlation in more recent years. But does this mean that investors should take on the yen risk by packaging it on top of Japanese equities? Not necessarily, as the Japanese yen is even more negatively correlated to Japanese stocks than it is to the S&P 500, and Japanese stocks can thus take a bigger hit if the yen rises.

The three-year correlation of the S&P 500 and the yen was about -0.2, but the three-year correlation of the yen and the MSCI Japan Index (in yen) was -0.7. If an investor really wants a hedge for a bearish scenario in the U.S. equity markets, the historical correlation data would suggest that the yen could serve that choice as a stand-alone investment, but not when it's packaged with Japanese equities. It's possible to see the yen rising during a time when the U.S. economy slowed down significantly or China's economy had a particularly bad stretch. That does not seem to be a time when investors would want to also own Japan's stocks, which could potentially take away some of the benefit of holding the yen.

The historical volatility profile of the yen and Japanese equities also reveals an interesting characteristic. During the period we call "the Abe period," we show how a strongly weakening currency of about 6.0% per year led to significant gains in the equity markets—up over 19% per year. This led to higher volatility for Japanese stocks. But this was volatility that should be desired—stocks were doing well as the currency was declining. Owning both the yen and the stocks in Japan over this period led to returns of about 12% per year—approximately two-thirds that of the equities alone. The fact that packaging the equity risk and currency risk lowered volatility does not seem like a desirable goal for international equities; rather, it is the ultimate reason to own many of these foreign markets.

FIGURE 10: THE YEN HAS EXHIBITED NEGATIVE CORRELATION TO THE S&P 500 INDEX



Sources: WisdomTree, MSCI, 3/31/1986–12/31/2017. You cannot invest directly in an index. Past performance is not indicative of future results.

FIGURE 11: BUT THE YEN IS MORE NEGATIVELY CORRELATED TO JAPANESE EQUITIES



Sources: WisdomTree, MSCI, 3/31/1986–12/31/2017. You cannot invest directly in an index. Past performance is not indicative of future results.

FIGURE 12: DOES THE YEN LOOK INTERESTING AS A STAND-ALONE ASSET CLASS?

Period	Returns			Volatility Levels				Sharpe Ratio			Correlations to S&P 500			Correlation to MSCI Japan
	Japan w/ Yen	Japan no Yen	Yen	Japan w/ Yen	Japan no Yen	Yen	S&P 500	Japan w/ Yen	Japan no Yen	S&P 500	Japan w/ Yen	Japan no Yen	Yen	Yen
3/31/86-12/31/17	3.8%	2.3%	1.4%	20.9%	19.4%	11.2%	14.9%	0.03	-0.05	0.48	0.40	0.47	-0.08	-0.17
11/30/12-12/31/17 (Abe Period)	12.1%	19.2%	-5.9%	12.3%	16.5%	9.8%	9.3%	0.97	1.15	1.66	0.57	0.58	-0.27	-0.67
3 Year	11.6%	9.3%	2.1%	12.5%	16.4%	10.3%	10.1%	0.90	0.55	1.10	0.74	0.71	-0.24	-0.66
5 Year	11.2%	17.2%	-5.2%	12.3%	16.2%	9.7%	9.5%	0.89	1.05	1.64	0.58	0.61	-0.28	-0.65
10 Year	3.2%	3.3%	-0.1%	15.7%	19.8%	10.4%	15.1%	0.18	0.15	0.54	0.72	0.68	-0.22	-0.62
20 year	3.8%	3.1%	0.7%	17.2%	18.0%	10.7%	14.9%	0.11	0.07	0.36	0.59	0.58	-0.03	-0.38

Sources: WisdomTree, MSCI, 3/31/1986–12/31/2017. Japan w/ yen refers to the MSCI Japan Index priced in U.S. dollars. Japan no yen refers to the MSCI Japan Index priced in the local currency. Yen refers to the underlying currency exposure of the yen against the U.S. dollar. Past performance is not indicative of future results. You cannot invest directly in an index. Abe period is from 11/30/2012–12/31/2017.

THE 50/50 HEDGED MODEL

Gary Gastineau, in 1995, wrote a paper titled "The Currency Hedging Decision: A Search for Synthesis in Asset Allocation." His conclusion, with a recommendation for changing the default baseline benchmark, has a nice appeal to it:

A portfolio's currency allocation deserves more attention than it typically gets, and the currency allocation decision should be integrated with allocations to other asset classes. The appropriate currency-hedging decision is neither complete hedging back to an investor's base currency nor total avoidance of currency hedging.

In the absence of a compelling case for any other ratio, we suggest a 50/50 hedged/unhedged currency benchmark. This benchmark should modestly improve the long-range performance of portfolios with passive currency-management policies. More significantly, the existence of persistent opportunities for adding value with exchange rate forecasting techniques suggests that the 50/50 benchmark is no more—and no less—than a good place for an active currency manager to start.²⁴

Deciding when to dial up the hedged allocation or add more currency risk to the 50/50 baseline hedged allocation could be viewed as the active²⁵ decision.

²⁴ Gary L. Gastineau, "The Currency Hedging Decision: A Search for Synthesis in Asset Allocation," *Financial Analysts Journal*, May–June 1995.

²⁵ Active: Funds that attempt to outperform the market by selecting securities that a portfolio manager believes to be the best.

WHY DYNAMICALLY HEDGE CURRENCY EXPOSURES?

WisdomTree believes there is a strong case to be made that currency-hedged solutions provide a more attractive strategic and baseline exposure for long-run portfolios. However, many investors are reluctant to switch to a fully hedged strategy for fear of missing a period when currency exposure contributes to returns—even if using a fully hedged approach could result in lower volatility over the long run. Some investors also have concerns about their ability to decide when to rotate between hedged and unhedged strategies and so have either left that decision to their active managers or have defaulted to their status quo and retained currency exposure.

DYNAMIC HEDGING AS LONG-RUN CORE ALLOCATION

WisdomTree created a solution to serve as a core, long-run international equity allocation that embeds a dynamic currency-hedging program that solves the challenge of trying to time the currency hedge.

WisdomTree partnered with Record Currency Management to use its currency research and currency signals in order to dynamically hedge currency exposures in international equity indexes. We believe this represents an important evolution in currency-hedged strategies.

The first step to developing a currency model is to carefully specify the signals that will be used. Adjustments to WisdomTree's currency hedge and how much to hedge are the result of a rules-based, well-researched and codified process developed in conjunction with Record Currency Management.

THE THREE SIGNALS USED:

- + The Momentum²⁶ Signal: 33.3% of the total hedge ratio is determined by relative price momentum of the foreign currency with reference to two moving average signals on the historically observed spot rates over 10 and 240 business-day periods. Simply put, a downward trend in the currency would signal to put on the hedge, whereas an upward or appreciating trend would signal to take it off.
- + The Interest Rate (Frequently Referred to as Carry²⁷): 33.3% of the total hedge ratio is determined by measuring the difference in interest rates, as implied in one-month foreign exchange forwards²⁸, between each currency and the U.S. dollar. If the implied interest rate in the United States is higher than that in the targeted currency, a further 33.33% hedge ratio is applied for this signal.
- + Value: The final 33.3% of the total hedge ratio is determined by a value signal that references foreign currency spot exchange rates smoothed over 20 business days and a band of over/under-valuation of 20% versus the latest Purchasing Power Parity (PPP)²⁹ as published by the Organization for Economic Cooperation and Development (OECD).

The signals are equally weighted at one-third each in terms of contribution to the overall index hedge ratio because it is very difficult to know which of the signals will have the greatest influence on a currency's performance against the U.S. dollar from month to month.

²⁶ Momentum: Relates to the tendency of recent behavior of asset prices to continue to influence the future behavior of asset prices.

²⁷ Carry: The amount of return that accrues from investing in fixed income or currency forward contracts.

²⁸ One-month foreign exchange (FX) forwards: Agreement between two parties to exchange a specified amount of foreign exchange at a specified price at a specified point in the future.

²⁹ Purchasing Power Parity: Academic concept stating that exchange rates should adjust so that equivalent goods and services cost the same across countries, after accounting for exchange rate differences.

SUMMARY

The discussion of currency-hedged strategies has shaken some of the core beliefs of investors. Traditional investment vehicles that package equity risk plus a secondary currency risk on top of the equity risk have been referred to as the traditional "plain vanilla" exposure because they were the first to the market, and these are what investors have been using for a long time. But we believe that, for investors starting with a clean slate, adding currency risk on top of the equity market is actually more exotic than currency hedging. We believe it's necessary to take a harder look at the diversification attained by adding in this FX risk. If investors evaluated FX as a pure stand-alone investment instead of a packaged product, we think they would rarely find themselves convinced of the reason to add in this exposure to their portfolios all the time.

Investors should ask themselves: Why am I taking FX risk in my international portfolio? It is fairly easy now and rather inexpensive—especially on a relative interest rate basis—to hedge developed world FX exposure to currencies such as the euro and the yen. We think that more and more U.S. investors will come to this view in the coming years.

Investors should carefully consider the investment objectives, risks, charges and expenses of the Funds before investing. To obtain a prospectus containing this and other important information, please call 866.909.WISE (9473), or visit wisdomtree.com to view or download a prospectus. Investors should read the prospectus carefully before investing.

Index performance does not represent actual fund or portfolio performance. A fund or portfolio may differ significantly from the securities included in the index. Index performance assumes reinvestment of dividends but does not reflect any management fees, transaction costs or other expenses that would be incurred by a portfolio or fund, or brokerage commissions on transactions in fund shares. Such fees, expenses and commissions could reduce returns.

Foreign investing involves special risks, such as risk of loss from currency fluctuation or political or economic uncertainty. Investments in currency involve additional special risks, such as credit risk and interest rate fluctuations. Hedging can help returns when a foreign currency depreciates against the U.S. dollar, but it can hurt when the foreign currency appreciates against the U.S. dollar.

The MSCI information may only be used for your internal use, may not be reproduced or disseminated in any form and may not be used as a basis for or component of any financial instruments or products or indexes. None of the MSCI information is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Historical data and analysis should not be taken as an indication or guarantee of any future performance analysis, forecast or prediction. The MSCI information is provided on an "as is" basis, and the user of this information assumes the entire risk of any use made of this information. MSCI, each of its affiliates and each entity involved in compiling, computing or creating any MSCI information (collectively, the "MSCI Parties") expressly disclaim all warranties. With respect to this information, in no event shall any MSCI Party have any liability for any direct, indirect, special, incidental, punitive, consequential (including loss profits) or any other damages. (www.msci.com)

MSCI EAFE Index: A market cap-weighted index composed of companies that are representative of the developed market structure of 21 developed countries in Europe, Australasia and Japan. S&P 500 Index: A market capitalization-weighted benchmark of 500 stocks selected by the Standard & Poor's Index Committee, designed to represent the performance of the leading industries in the United States economy. MSCI EMU Index: A free float-adjusted market capitalization-weighted index designed to measure the performance of the markets in the European Monetary Union. MSCI Japan Index: A market cap-weighted subset of the MSCI EAFE Index that measures the performance of the Japanese equity market. MSCI World Index: A broad, developed world equity index inclusive of the U.S. and Canada, weighted by float-adjusted market capitalization.

WisdomTree Funds are distributed by Foreside Fund Services, LLC, in the U.S. only.

Jeremy Schwartz & Christopher Gannatti are registered representatives of Foreside Fund Services, LLC.

© 2018 WisdomTree Investments, Inc. "WisdomTree" is a registered mark of WisdomTree Investments, Inc.

WTGM-0560