Peeking Through the Hedge

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"Any time you take a chance you better be sure the rewards are worth the risk"

Stanley Kubrick

IN A NUTSHELL

— Currency operates differently from most other asset classes in a portfolio context. Both the return and the risk equations need tweaking – the math is not hard, but it matters.

— One notable feature is that the relationship between risk reduction and the hedge ratio is a curve that may benefit the start of a hedging program more than its completion.

— Investors who benchmark to an unhedged international sleeve, and who may be reluctant to hedge for that reason, might benefit from reducing some currency risk, even if a full hedge is not preferred.

Yes, We're Going There

Here at DWS we have devoted an extraordinary amount of time to analyzing the role that currency plays in a portfolio (because we think it's very important, not because we don't have anything better to do!). And we have also made considerable efforts to share our thoughts on this topic with our clients, and the industry more broadly. Indeed, we created what we believe is an original and straightforward framework to help answer this very question (see the Bibliography).

Of course, there remains very vibrant debate about this topic, and there is also the considerable practical difficulty that many investors have (and often remind us of) which is that they benchmark to an unhedged index (i.e. one with full international currency exposure). In this note, we don't propose to go through either the empirical case for hedging, or the framework. Instead, we want to share a finding that we believe is rather interesting, but, yes, we will be the first to admit, is quite "in the weeds" of currency hedging.

Until now it wasn't necessary to go this deep, partly because our time and attention was focused on the broader topic of the hedging framework, and partly because we never felt there was any real appetite in the industry to delve much deeper. Interestingly, this seems to have changed. Over the last several years we have noticed a far greater familiarity and comfort with the intricacies of currency exposure, and we have broached the topic in this paper without noticing any eyes glazing over. Accordingly, we think it's about time we discuss – strap yourselves in – the fact that risk reduction occurs at a different rate, depending on the hedge ratio one applies.

Now that statement of course needs a lot of unpacking, but we promise that all will become clear. Firstly, we hope you agree, as we have often claimed, that the easiest way to think about an unhedged international allocation (and we will assume to equities, but it could be any asset not traded in US dollars), is as a two-asset portfolio. One asset is the equity, and the other is the currency it trades in. And, crucially, we argue that, for an unhedged investor, the weights on those two assets are 100% each, and not 50% each as one might assume (and is normal for a two-asset portfolio).

Why is this uniquely the case for currency? It is simply because the equation for an international return to a US investor is the equity return *multiplied* by the currency return (not added). An example will clarify. If an investor held half their money in US stocks, and half in US bonds, and each returned 10%, then the portfolio return would simply be 10%. However, if that same investor held all their money in unhedged Japanese stocks, then, if the stocks were up 10%, and the yen were also up by 10%, now their portfolio return would be 21% (based on this simplified, illustrative example, which does not reflect actual or expected performance). Essentially, it's the difference between adding returns, and multiplying returns, and currency is almost unique in operating this way.

If this all seems trivial, then we congratulate you, because it wasn't to us! And part of the reason for this, is that, if you recall reading about expected returns in a finance textbook, examples are almost always given (at least in our experience) for two assets that add up to 100% (and not 200% as is the case with currency). This matters very much, because it means one needs to retrain one's finance brain to operate in this world.

The Grizzly Details

Allow us to take it a step further, and shift to the risk side of the equation. Here, again, the analysis is different, and a touch more complex so please bear with us. Suppose you had one asset with a 16% volatility, and one with 10%. In the "normal" two-asset portfolio world, try as you might, you would never be able to get any blend of those two assets (i.e. any two weightings that sum to 100%) where the risk exceeds 16%. Indeed, the riskiest possible portfolio would simply be 100% allocated to the 16% volatility asset.

Amazingly though, in currency world, suppose you had a 16% equity volatility, and a 10% currency volatility, and assume for the moment they were perfectly correlated (correlation being the third part of portfolio risk), now the risk of the portfolio would be (drum roll, please)…26% in this example. In other words, the risk of the portfolio would now be the sum of the two individual risks, or, as we put it at DWS, currency has levered the portfolio.

Of course, the idea that international currency and equity are perfectly correlated is not a reasonable one. Investors should probably come up with their own assumptions for that (and it won't be perfect correlation of one), but, for the purposes of moving the argument forward, let us assume that the correlation is zero. This means that essentially there is no relationship between equity moves in, say, Germany, and moves in the euro (which, as it turns out, we believe is a reasonable long-term view). Well, even now, with two uncorrelated assets, you may be expecting that we can do better from a risk perspective, using the feature of diversification to reduce risk. Unfortunately, it's not so. The volatility of such an unhedged allocation to German equities would be 18.9%, still riskier than either asset alone.

In previous papers we carefully went through all the math that proves this (invoking the Pythagorean theorem surprisingly). It's not all that complicated, it's simply a matter of using the standard portfolio risk equation for a two-asset portfolio and inputting a 16% volatility and a 10% volatility with a weighting of 100% to each, and a correlation of zero. This calculation yields a result of approximately 18.9% in our example, based on the stated assumptions (and may be worth your verifying independently). How can two uncorrelated assets blend to produce higher risk? Well, the answer is that, while the low correlation is trying to pull the risk down, the higher weighting to both assets is driving it up. Put another way, there are now two competing risk forces – and it's the leverage that's dominating.

Your Reward for Sticking with Us

If the above section was painful to read, we (sort of) apologize. The truth is we believe it's a very important, and very poorly understood, finding (and we're not trying to tout our intellect here in any sense, this is complex, and it took us a very long time to figure it out). But, let us conclude with what we hope might be a slightly more welcome finding for investors.

Firstly, the simplest solution, assuming you don't have any strong currency views, or conviction that international currencies will appreciate, is to fully hedge out currency risk. It turns out that this can easily be done in modern financial markets in several different ways.

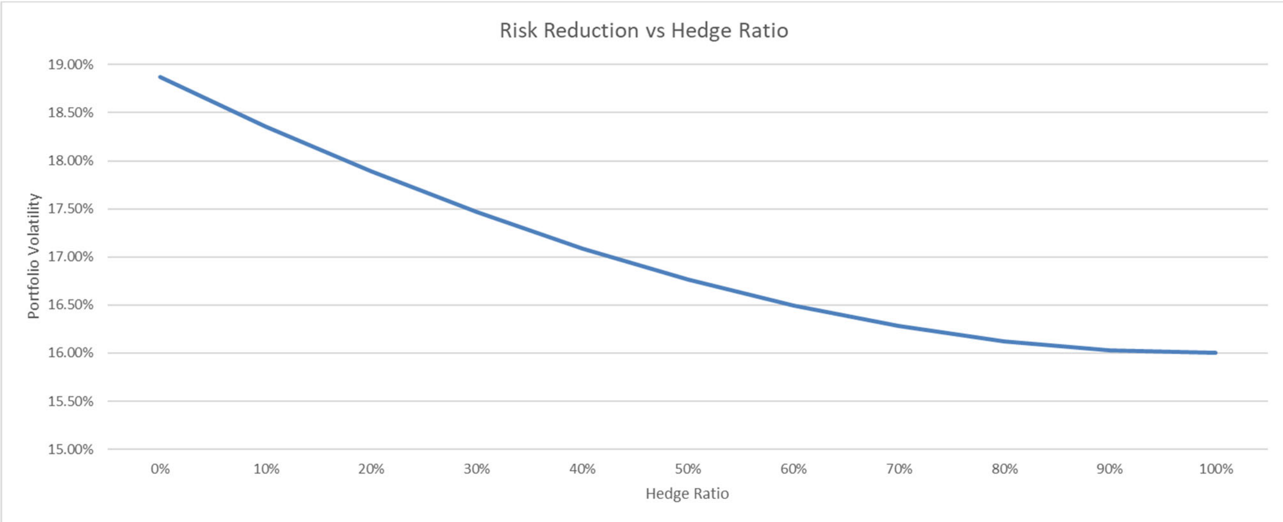
However, for investors who benchmark to unhedged international indexes (which, in our experience, is the vast majority), Figure One should be quite interesting. Let us explain what it shows. Along the y-axis is the portfolio risk for an international allocation, assuming the same details as we have outlined above – one asset with a 16% volatility, one with a 10% volatility, and a correlation of zero. To be clear, these are arbitrary numbers. We have simply chosen them as illustrative starting points for equity risk, currency risk, and equity-currency correlation, but investors should absolutely feel free to change those assumptions to whatever they think is reasonable.

Along the x-axis is the hedge ratio. Effectively this is the amount of the currency risk that we are assuming one is removing. So, on the left, 0% means that the investor is removing none of the currency risk and is fully unhedged, and, on the right, 100% means that they are fully hedging out all of the currency risk. And, it turns out that any permutation between these two extremes is fairly straightforward to achieve by blending one's hedged and unhedged exposures in the relevant weights.

The first feature to note from the chart is that the risk of the unhedged portfolio (i.e. the most extreme point on the left) is indeed 18.9%, as we stated above. Secondly, note that the best you can do in terms of risk reduction is to remove all currency risk (the right most point), and doing so will get you just to the equity risk itself, 16%. Exactly, we hope you agree, what you would expect in this example. Essentially the currency hedge has moved the investor back to a one-asset portfolio.

Why therefore is this chart so powerful, and, we hope, interesting for investors? It is because of its shape. Notice that the line is a curve with a steeper downward slope on the left, than on the right. What is the investment implication of this? It is that even some currency hedging should help to reduce risk. And that the most risk reduction comes as you start to hedge (not as you complete the hedge). In other words, the rate of risk reduction is not proportional to the hedge ratio, you likely will get more bang for your buck (more risk reduction per unit of hedge) at the beginning than at the end.

Figure One: A Portfolio Risk's Reduction vs The Hedge Ratio



Source: DWS, as of 10/25

Again, putting some numbers to this (and under all the arbitrary numbers we are using), the risk of the unhedged portfolio would be 18.9%, and the risk of the fully hedged portfolio would be 16%. But, crucially, the risk of the half-hedged portfolio (50% hedge ratio) would be 16.8% (and not the 17.4% one might expect as halfway between the two endpoint risks). So, investors could potentially achieve around 72% of the total possible risk reduction in this example (that's 2.1% of 2.9%), for just a 50% hedge ratio.

Why could this matter? Well, one reason is that investors who benchmark to an unhedged international sleeve, and who understand the risk reduction of currency hedging but don't want the tracking error, might be more comfortable applying partial hedges if they understand that the initial stages of these hedges may be particularly impactful.

Of course, we'd be the first to concede that the risk reduction numbers may appear modest, but, keep in mind that finance is a fight for every basis point, and, given the conditions that prevail today for US investors (and have done for more than a decade) in which the cost to hedging developed market currency is very low, we would argue that these are basis points that shouldn't require much of a fight.

Conclusions

We believe that currency exposure is an important aspect of portfolio construction, and that investors should think very carefully about its impact. In today's financial markets, it can be a very straightforward risk to manage.

In other work we have laid out what we think is a straightforward and comprehensive framework for evaluating currency risk, along with the considerations for whether, and how much to hedge. However, we note the increased comfort that investors, and the industry more broadly, now have with these issues. It's time to go deeper.

In this paper we delve into a particular aspect of the way in which risk drops as the hedge ratio changes. It turns out that, depending on the investor's assumptions, the risk reduction is more notable for the initial stages of a hedging program.

This, we believe, may offer a useful insight for those that use an unhedged international benchmark. It may be possible to better manage the trade off between tracking error and risk reduction. We hope it's useful.

References

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Glossary

Basis Point: one basis point equals 1/100 of a percentage point.

Carry: the cost or benefit from holding an asset or following a particular investment strategy.

Correlation: the statistical relationship between two variables, indicating to what extent they tend to be away from their means at the same time.

Currency Hedging: in finance, a hedged investment uses financial instruments to reduce or eliminate the risk from currency fluctuations, aiming for more stable returns by locking in an exchange rate. Hedging protects against potential currency losses but also sacrifices potential currency gains, while unhedged investments expose investors to both currency risks and opportunities.

Diversification: refers to the dispersal of investments across asset types, geographies and so on with the aim of reducing risk or boosting risk-adjusted returns

Leverage: attempts to boost gains when investing through the use of borrowing to purchase assets.

Tracking Error: is an unwanted deviation between, for example, an index fund and a portfolio.

Volatility: is the degree of variation of a trading-price series over time. It can be used as a measure of an asset's risk.

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