Invesco Vision Case Study 10: Currency hedging
Addressing currency risk

Invesco Vision has been designed to work with various base currencies and best represent the interests of clients across various economic regions. Whenever currencies are involved, two different issues need to be addressed. First, we need to be able to adjust return expectations to the relevant base currency, and second, we need to address any embedded currency risks. For the former, we rely on an interest rate risk parity model which implies that currencies will appreciate/ depreciate by the same amount as the respective sovereign interest rate differentials. For the latter we rely entirely on the risk model covariance matrix.

To demonstrate these ideas in practice, we start by constructing an example based entirely on USD-denominated asset blocks as shown in left portion of Figure C10a. Here we are viewing the assets from a USD perspective and there is no embedded currency risk. As can be seen, the efficient frontier begins at low risk levels, comprised almost entirely of the US Aggregate bonds and gradually adds other components such as equities and high yield to further increase the return.

We then move to the right portion of Figure C10a. Here we change the base currency to EUR. More specifically, we assume that a European based investor is looking at the same exact asset blocks as before and is using them to construct a EUR-based efficient frontier. There are several things to notice. First, the returns associated with all of the asset blocks and the efficient frontier itself are lower. This is a direct result of higher USD interest rates implying a future depreciation of the dollar vs the euro as dictated by the interest rate parity model. Second, all risk values are meaningfully higher. This is also to be expected as the portfolio now encompasses currency risk. Finally, the asset allocation structure along the efficient frontier is slightly different. This is due to the optimizer exploiting currency factor correlations to improve the risk-return trade-off.

Figure C10b proceeds with the same asset blocks, continuing to view the problem from a EUR-based perspective. However, in this case we assume that all assets are currency hedged to the EUR. There are a few things to notice. First, the expected returns remain unchanged at the lower levels we observed in the previous unhedged example. This is dictated by the way currency hedging works. More specifically, the modeled cost of currency hedging is based on the very interest rate differentials we used to project how we expect exchange rates to evolve. So, while we get to the return adjustment through a different path, the resulting adjustments are identical. The second and most interesting feature of the efficient frontier is that the underlying asset allocation is now identical to the original USD based asset allocation. Putting the two observations together, we can conclude that the impact of switching to a different base currency, combined with full currency hedging,only results in a vertical shift of the efficient frontier. The extent of the shift is dictated by the interest rate differential between the two currencies.

Figure C10a: Currency hedging
Unhedged USD- and EUR-based efficient frontiers

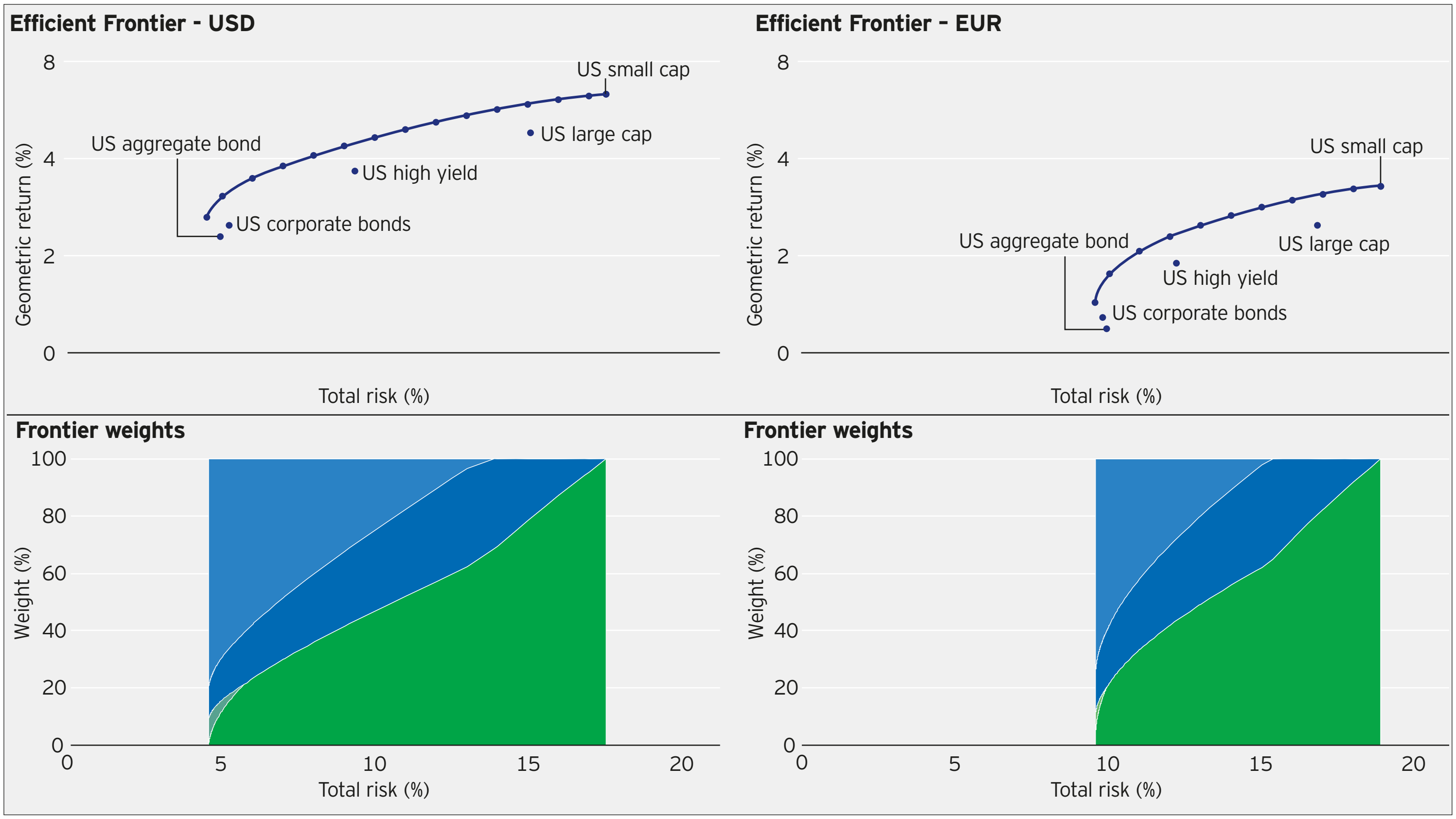
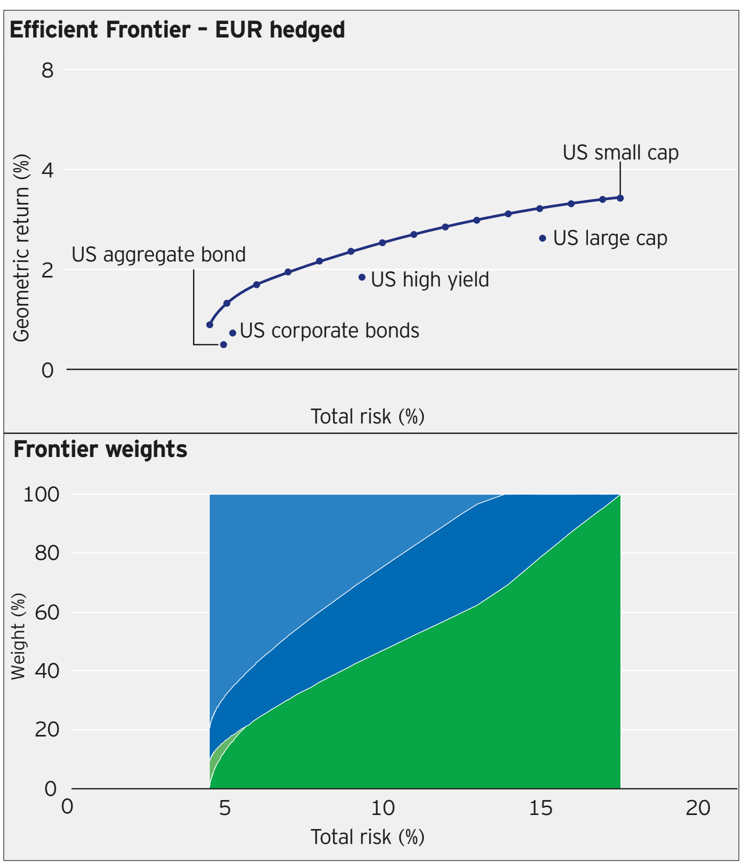


Figure C10b: Currency hedging
Hedged EUR based efficient frontier



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