Imperfect currency hedging

Russell Investments

Communique 2019

Ronal Prasad
Investment Analyst

Andrew Johnson
Licensed Independent Trustee

It is generally accepted that currency hedging provides investors with, more or less, pure exposure to the returns (and risks) of underlying investment markets. However, in practice, the extent which the returns differ can, at times, be reasonably significant.

In this paper, we find that imperfect currency hedging has adversely impacted returns for hedged global equities, by more than 0.5% p.a. over the past 30 years.[1] Perhaps surprisingly, however, we also conclude that this practical reality should have no bearing on an investor's currency hedging decision.

Why is the exposure only "more or less" pure?

Relative to the theoretical, pure exposure, the return from a currency hedged position will reflect:

- Forward points, which result from differences between:
  - (i) the contracted exchange rates for converting the foreign currency exposure into NZD at a fixed future date; and
  - (ii) current exchange rates.
- Gains or losses resulting from imperfect currency hedging.

Forward points

Relative to current exchange rates, forward exchange rates reflect the differences in interest rates between countries.[2] Hedging from a lower interest rate country into a higher interest rate country results in positive forward points, and vice versa. New Zealand interest rates have generally been higher than those offshore, particularly those of large, developed countries. As a result, forward points have usually enhanced local returns for NZD hedged investors. In fact, there have only been a handful of months in the past 30 years where the impact has been negative.[3]

[1] We have focused this study solely on global equities. It is generally accepted that global fixed interest should be fully hedged. Moreover, most investors who seek residual foreign currency exposure achieve this through global equities (rather than, say, global listed property). Nonetheless, we have undertaken some high-level analysis for global fixed interest and conclude that the impact of imperfect hedging for this asset class is minimal (slightly positive for a sovereign-only exposure and slightly negative for an aggregate sovereign/credit exposure). While we have not considered the likes of global listed property, we surmise that the impact of imperfect hedging for other global growth asset classes would be similar to that for global equities.

[2] Johnson, A., The mechanics of currency hedging using forward contracts, February 2014.

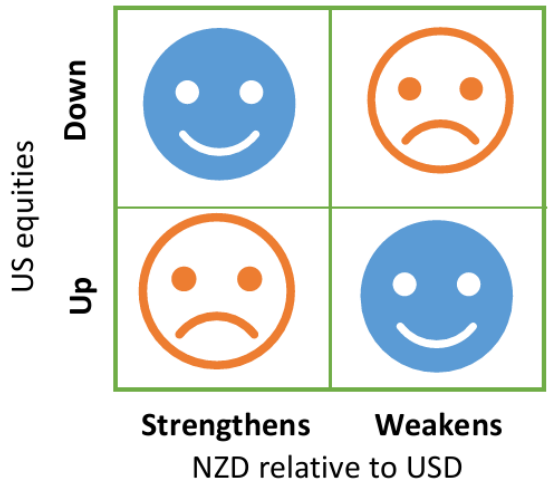
[3] Forward points have been close to 3% p.a. in the period from January 1989, when a NZ Dollar hedged version of the MSCI World Index was introduced, to September 2018. Currently, forward points are closer to 1-1.5% p.a. We continue to believe that New Zealand interest rates will, on average and over time, be higher than offshore interest rates and therefore provide a return premium for NZ investors.

Imperfect hedging

Imperfect hedging occurs for a number of reasons. These might include practical matters such as fund cashflows and the use of proxy currencies. However, more fundamentally, the reason that hedging is imperfect is that we don't generally know the future value of our asset in advance. That is, we hedge the beginning value, not the ending value of our investment.

Consider a simple example. I own US$1m of equities and want to hedge against changes in the NZD/USD cross-rate.4 I enter into a forward exchange contract to sell US$1m/buy NZD in, say, 1 month at the forward rate. So far, so good. However, if the value of my equities increases to US$1.1m, the US$0.1m gain is not covered by the hedging contract. That is, I'm under-hedged. Conversely, if my equities had fallen in value, I would be over-hedged. Whether the hedging mismatch has a positive or a negative impact will depend on what has happened to the NZD/USD cross-rate. This is demonstrated in figure 1.

Figure 1: Hedging mismatch – gain or loss?



Let's say my US equites increased in value and the NZD/USD cross-rate fell (bottom right quadrant). First, while my initial USD exposure is hedged, I now have an *additional, unhedged USD exposure* where the NZD value is subject to changes in the cross-rate. Second, the NZD has weakened, which means the *USD has strengthened*. So, relative to being perfectly hedged, I would benefit from this additional, unhedged exposure to a stronger USD.[5]

Alternatively, let's say my US equites dropped in value and the NZD/USD cross-rate fell (top right quadrant). First, my sell USD/buy NZD hedging contract is for a greater amount than the value of my US equities. Effectively, I have a *short exposure to unhedged USD*. Secondly, as above, the *USD has strengthened*. So, relative to being perfectly hedged, I would be worse off as a result of this short exposure to a stronger USD.

Has imperfect currency hedging impacted returns?

From figure 1, it is evident that imperfect hedging will have:

- A benefit, if the correlation between the foreign asset and the NZD/foreign currency cross-rate has been negative (i.e., when one is up the other is down – top left and bottom right quadrants).
- A cost, if the correlation has been positive (i.e., they are both up or down at the same time – top right and bottom left quadrants).

For global equities, the correlation with the change in the NZD/foreign currency cross-rate over the last 30 years is approximately 0.4.[6] That is, more months fall into the bottom left and top

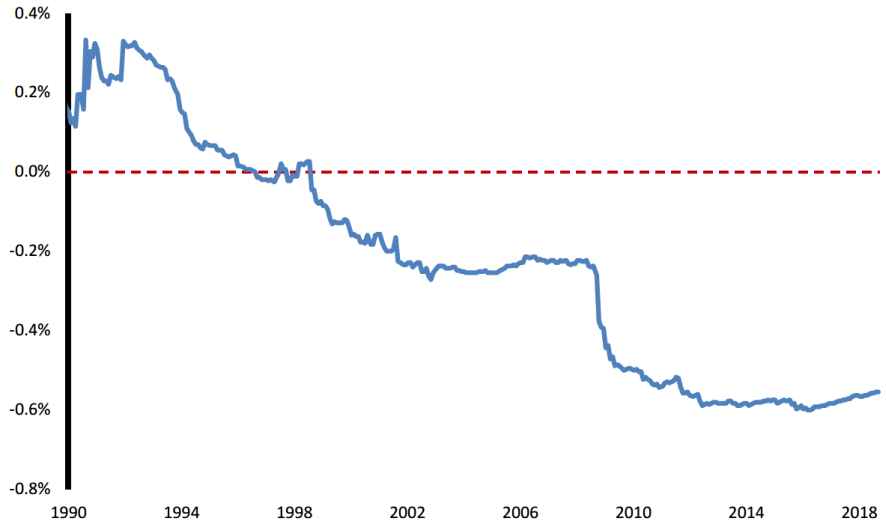
[4] The NZD/USD cross-rate is how much USD can be purchased with NZ$1.

[5] Strictly speaking, the NZD/USD cross-rate movement needs to be assessed relative to the forward rate rather than the start-of-period spot rate. For the purpose of this exercise, it is reasonable to ignore this detail.

[6] MCSI World Index in Local Currency and MSCI World Index in NZD January 1989 to June 2018.

right quadrants of figure 1 than into the other two quadrants. Accordingly, as shown in figure 2, the impact of imperfect hedging has been negative, averaging more than -0.5%.

Figure 2: Annualised impact of imperfect hedging for global equities (January 1989 to June 2018)



It is apparent from figure 2 that the impact of imperfect hedging is far from constant. While the overall impact is a reasonably-significant negative, there are periods where imperfect hedging has provided a benefit. It is also evident that events such as the global financial crisis have made a material contribution to the overall negative outcome. That is, the major sell-off in equity markets was accompanied by a material fall in the NZD. This was most pronounced in the month of October 2008 where global equity markets declined by more than 16% and the NZD was down by more than 11%. Despite forward points of close to 0.5%, the NZD hedged return lagged the local currency return by approximately 1.4%.

Overall, while forward points have enhanced the global equities return for fully hedged NZ investors, imperfect hedging has reduced the overall gain relative to the local currency return[7].

We have focused this study solely on global equities. It is generally accepted that global fixed interest should be fully hedged. Moreover, most investors who seek residual foreign currency exposure achieve this through global equities (rather than, say, global listed property). Nonetheless, we have undertaken some high-level analysis for global fixed interest and conclude that the impact of imperfect hedging for this asset class is minimal (slightly positive for a sovereign-only exposure and slightly negative for an aggregate sovereign/credit exposure). While we have not considered the likes of global listed property, we surmise that the impact of imperfect hedging for other global growth asset classes would be similar to that for global equities.

[7] The overall outperformance of NZD hedged global equities relative to the local currency return is approximately 2.5% p.a. for the period January 1989 to June 2018.

What are the implications of imperfect currency for an investor's currency hedging decision?

Absent what we've just learned above, the hedged return is often assumed to be:

- Local currency return (LC) + forward points (FP) [1]

Similarly, the unhedged return is often considered to be:

- LC minus change in NZD/foreign currency cross-rate (ΔNZD)[8] [2]

That is, when deciding to hedge or not, the return side of the decision would simplistically seem to come down to:

- If hedged – the investor picks up some forward points (which could, in fact, be negative); or
- If unhedged – the investor either: (i) foregoes some return if the NZD appreciates (foreign currency depreciates); or (ii) gains some return if the NZD depreciates (foreign currency appreciates).

However, as we have already seen, the actual return from being hedged is a bit more complicated than as shown in [1] above. The complete formula for the hedged return is:

- LC + FP – (LC x ΔNZD) [3]

The third term in [3] reflects the fact that a portion of our investment, being the change over the hedging period in the local currency value, is not hedged. That is, we hedged the beginning value only. As shown in the previous section, this will give rise to: (i) a loss where the market and the NZD move in the same direction; or (ii) a gain where they move in opposite directions.

Further, [2] above isn't the correct equation for the unhedged return. It ignores the fact that the change in the NZD/foreign currency cross-rate impacts not only on our original funds but also on the change in our asset value. The unhedged return is more accurately:

- (1 + LC) x (1 – ΔNZD) – 1 or LC – ΔNZD – (LC x ΔNZD) [4]

Comparing [3] and [4] and noting that both include an identical third term, we are left with the same difference between hedged and unhedged returns as we saw with the 'simplistic' equations, [1] and [2].

That is, whether or not we seek to hedge our exposure, the change in the local currency value of our investment will always be unhedged. Therefore, the return impact of the practical reality of imperfect hedging should not influence an investor's currency hedging decision.

[An example of each of formulae [3] and [4] in practice is shown in Appendix 1].

[8] This needs to be expressed in the form of how much more/less NZD we will receive from selling our foreign currency, rather than how much less/more foreign currency we can buy with our NZD. If the opening and closing NZD/foreign currency spot rates are S0 and S1, respectively, the required calculation is: 1 – [(1 / S1) / [(1 / S0)] or 1 – (S0 / S1).

Appendix 1

Hedged example

At the beginning of the year, I have NZ$100.00 that I convert at the spot exchange rate S0 of 0.70 into US$70.00 to purchase an investment. At the same time, I enter into a forward contract to exchange US$70.00 into NZD at a rate of 0.68 in one year's time. Over the year, the local currency return of my investment is 10.00%, meaning that I end the period with US$77.00. Of this, US$70.00 is effectively converted at the agreed forward rate of 0.68 = NZ$102.94, while the remaining US$7.00 is converted at the end-of-period spot exchange rate S1 of 0.73 (an appreciation in the NZD/depreciation in the USD) = NZ$9.59. In total, I now have NZ$112.53. This represents a return of 12.53% on my initial capital.

From [3], my NZD return is LC + FP – (LC x ΔNZD). The component returns are:

- LC: 10.00%
- FP: This can be calculated from initial spot rate and the agreed forward rate as 0.70/0.68 -1 = 2.94%, but can more easily be determined from the NZ$2.94 uplift in the conversion to and from USD of my original capital (NZD100.00).
- ΔNZD: From the formula at the bottom of page 4 [1 – (S0 / S1)], this is 1 – (0.70/0.73) = 4.11%

Putting this all together, my return is 10.00% + 2.94% – (10.00% x 4.11%) = 12.53% (as above). Relative to the local currency return of 10.00%, I gained 2.94% from forward points but lost 0.41% from imperfect hedging. Both the local investment and NZD appreciated over the period meaning that a portion of my investment was unhedged at a time when the currency (USD) in which my investment was denominated fell in value.

Unhedged example

At the beginning of the year, I have NZ$100.00 that I convert at the spot exchange rate S0 of 0.70 into US$70.00 to purchase an investment. Over the year, the local currency return of my investment is 10.00%, meaning that I end the period with US$77.00. At end-of-period spot exchange rate S1 of 0.73, this is converted into NZ$105.48. This represents a return of 5.48% on my initial capital.

From [4], my NZD return is LC – ΔNZD – (LC x ΔNZD). The component returns are:

- LC: 10.00%
- ΔNZD: 4.11%

Putting this all together, my return is 10.00% – 4.11% – (10.00% x 4.11%) = 5.48% (as above). Relative to the local currency return of 10.00%, I lost 4.11% from the conversion to and from USD of my original capital and a further 0.41% from the fact that the local currency gain on my original capital was also adversely impacted by the fall in the USD.

About Russell Investments

Russell Investments is a global asset manager and one of only a few firms that offers actively managed multi-asset portfolios and services, which include advice, investments and implementation. Russell Investments stands with institutional investors, financial advisors and individuals working with their advisors—using our core capabilities that extend across capital market insights, manager research, asset allocation, portfolio implementation and factor exposures to help investors achieve their desired investment outcomes.

For more information

Call Russell Investments at 0800 357 6633 or

visit **russellinvestments.co.nz**

Important information

First used: January 2019 NZ1-00126