A large volume of literature is devoted to the benefits associated with cross-border investments. However, until recently little attention has been paid to the currency component of international investments. There are few issues in the investment debate where such diametrically opposed views are supported by an array of sound academic and empirical evidence. Some argue strongly in favour of never hedging foreign investments; others argue that foreign investments should be hedged all the time. Still others favour hedging at “appropriate” times.

The purpose of this paper is to review the literature presented in favour of the competing views on hedging (100% versus 0%), and then to test these views through analysis of data relevant to an Australian investor in US, Japanese and German equities.

RECENT LITERATURE

It is common among academics and practitioners to characterise currency movements as random, and hence unpredictable (Mussa 1979, Meese and Rogoff 1983). What are the implications of randomness? Some would argue that any hedging just introduces transaction fees which cannot result in superior performance. Others argue that by implication there is no expected long-term real return from currency exposure. The extra volatility of unhedged returns will not be rewarded with higher returns. The rational investor should not bear the additional risk. It should be hedged away.

A Harvard professor, Andre Perold (1988), provided an eloquent argument for the full hedging of foreign currency risk. He held that USD-based investors were able to significantly reduce overall portfolio risk by hedging the currency exposure completely, and that this risk reduction did not result in any reduction in return. This argument was called the “Free Lunch in Currency Hedging”.

It is worth reviewing some recent literature to see if the randomness assumption holds. An almost universal finding in the literature is that the autocorrelations between changes in spot rates are very close to zero. This is taken to imply random walk. Hsieh (1989) explains that the low correlations between spot-rate movements cannot not be taken to imply random walk, unless the data can be well approximated by a normal distribution curve. The general consensus is that spot-rate movements do not conform to a normal distribution (Weigal 1991).

The most obvious departure from normality occurs because spot rates have a higher degree of probability mass concentrated around the mean. Weigal (1991) observes the coefficient of excess kurtosis is substantially higher than zero, where under normality it should be equal to zero. He also quotes research finding statistically significant coefficients of skewness. Given these observations of skewness and excess kurtosis, it appears incorrect to take the almost zero correlations to imply a random walk. If currency movements are indeed random, there should be no evidence of serial correlations. This can be tested using variance ratio testing.

Under random walk, as the time period is increased, the variance of return should increase in direct proportion, so that the ratio of variances should always equal 1. A statistic less than 1 indicates mean reversion, and greater than 1 indicates trending behaviour. Weigal used this methodology to test for this statistic.
in the currency market (from a USD base). Tests over the period 1973-1990, looking at holding periods of one week, one month, one quarter and out to three years, found a statistic greater than 1, suggesting trending behaviour in the currency markets.

The same tests were conducted for two sub periods, 1973-1981 and 1982-1990. In both cases, the tests provided further evidence of the trending behaviour of exchange rates. We performed some simple tests looking at the one-year, three-year and five-year holding period returns on the USD for and AUD investor. We used the period 1969-1993 as the data-set, and used trailing periods. This simple analysis showed a statistic greater than 1, suggesting trending behaviour.

Purchasing Power Parity theorem is often used to justify the stance that currencies have no long-run expected return. Of course, in the long run currencies are in fact backed by goods and services, and we do observe a long-run trend of the appreciation of lower-inflation currencies against higher-inflation currencies. However Keynes, himself a currency speculator in the 1920s, said that it was unclear whether spot rates moves towards PPP, or the other way around.

Some recent literature questions the usefulness of the PPP theorem in explaining currency movements, arguing that the nature of the currency market is inherently different to traditional asset formations. Wallace (1990) argues that there is no mechanism in the current system to ensure that currency rates will reflect fundamental values. In the short run at least, currency rates are determined by speculative forces (in the absence of government controls).

This is different from the equity markets, where common stock ownership entitles the holder to a stream of dividends, and where radical departures from "value" can be corrected through market actions such as LBO, or takeover. If currencies have no intrinsic value in themselves, there is nothing to bring them into line with macroeconomic fundamentals.

**EMPIRICAL RESEARCH**

The aim of our analysis is to draw some conclusions about whether an Australian investor is better to fully hedge, or never hedge, offshore equity investments. Our data shows the US, German and Japanese equity markets in two forms. We show the performance of the market in local currency terms - that is, the absolute performance of the market with no currency component. For the purpose of our analysis, this represents the fully hedged return from this market to an Australian investor. It shows the return the Australian investor would realise, had a perfect hedge been put in place. We are testing the rationale for hedging, rather than the efficiency of the actual hedge.

We looked at the market in AUD terms, by translating the local currency value of the market to AUD, using the spot rate at the end of each quarter. This is not perfect, and introduces a "timing effect"; however, we felt it was sufficient for our purpose. Our equity data for Australia, Japan and Germany are based on the MSCI equity indices based to 100 at the end of the fourth quarter 1969. We used the S&P 500 indexed to a base of 100. These local indices were converted to an AUD equivalent.

All currency data was indexed to a base of 100 for ease of manipulation. For example, at the end of 1969, the AUD/USD spot was 1.1200. This was indexed to 100. We calculated 12-month trailing period returns for two time periods. The entire data sample covered the period 4Q 1969 to 2Q 1993. Suspecting that much of the evidence is time-period dependent, we chose to consider a sub-period of 4Q 1980 to 2Q 1993. We considered two data series for each market.

We considered the returns on the markets in local currency terms, and this represents the fully hedged returns on these markets to an AUD-based investor. We also considered the returns on these markets when translated into AUD (based on quarterly revaluations). This information represents the unhedged returns on these markets to an AUD-based investor. We then calculated average returns and standard deviations of returns for these periods. We also calculated the cumulative return for the markets, on both a local currency and AUD basis.

**OUTPERFORMANCE**

In the case of US, Japanese and German equity market returns, the market when valued in AUD (unhedged) provided superior returns to fully hedged returns. In the cases of Japan and Germany, the cumulative outperformance was substantial. In the case of US equities, the
unhedged market returns provided significant outperformance over the fully hedged US equity market returns.

This was different from the longer time period, where the unhedged returns were only marginally better than the fully hedged returns. In the case of Japan and Germany, the trend apparent in the longer time frame was continued, with unhedged returns providing a significant degree of equity market.

Unhedged returns were significantly higher, with higher volatility. Again, without some idea of the risk appetite of the investor, it is hard to decide which position is "better".

REGRESSION ANALYSIS
We performed simple regressions on a range of variables to try to discern any strong relationships. Table 3 shows a summary of the correlation coefficients between Australian domestic returns and the returns on the foreign markets in both local currency and AUD terms. The output from the regression analysis is:

<table>
<thead>
<tr>
<th>Market</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P500 (hedged)</td>
<td>0.68</td>
</tr>
<tr>
<td>S&amp;P500 (unhedged)</td>
<td>0.55</td>
</tr>
<tr>
<td>Japan (hedged)</td>
<td>0.37</td>
</tr>
<tr>
<td>Japan (unhedged)</td>
<td>0.42</td>
</tr>
<tr>
<td>Germany (hedged)</td>
<td>0.44</td>
</tr>
<tr>
<td>Germany (unhedged)</td>
<td>0.36</td>
</tr>
</tbody>
</table>

We also performed a simple regression of the returns on foreign markets (unhedged) against the returns from holding the currencies of those markets. This analysis shows that there is no significant correlation between the performance of foreign markets and the performance of their currencies.

<table>
<thead>
<tr>
<th>Market</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P500</td>
<td>r = 0.12</td>
</tr>
<tr>
<td>Japan</td>
<td>r = 0.22</td>
</tr>
<tr>
<td>Germany</td>
<td>r = 0.18</td>
</tr>
</tbody>
</table>

OBSERVATIONS AND DISCUSSIONS
We should preface our conclusions with the comment that we have looked at international equity investments in isolation. In practice, we should consider this asset class in terms of its contribution to the risk and return of a wider portfolio. However, our purpose was to test the conflicting views that currency risk should be either fully hedged or never hedged. These positions have been argued without reference to other assets, so we believe our findings are still valid.

Our analysis shows that the academic argument that currency has no long-term expected return may hold in the long run. However, in both of the time periods considered (1969-1993 and 1980-1993) we found that the unhedged foreign equity market returns were considerably higher than the fully hedged returns. In fact, for
Germany equities in the period 1969-1993 the only reason the market outperformed Australia was the currency translation effect. When valued in DEM (fully hedged), the market underperformed.

Perold argues the "free lunch" position. He said that as there is no long-run expected return, one should hedge the currency risk completely to reduce volatility, without any long-run loss in return. Again, we found this argument to be without any empirical support. Generally, we found the unhedged returns were indeed more volatile than the fully hedged returns.

However, contrary to the expectations of Professor Perold, we found that this extra volatility was in fact rewarded with higher returns. Over the two time periods examined, the unhedged returns from the three markets have been considerably higher than the fully hedged returns. This is contrary to the notion that currency should have no expected returns. Perold argues that currency risk could be hedged away to reduce volatility, without reducing return. We found generally that volatility was certainly reduced, but so was return. In the case of the S&P 500 (1980-1993), unhedged returns were higher at a lower volatility.

The fact that unhedged returns have been higher than fully hedged returns may appear to be an endorsement of an unhedged policy. While the returns have certainly been higher, they have come at higher volatility, and the attractiveness of these returns will be a function of the risk aversion of the investor. For example, an investor with a very short time frame may find the volatility too much to bear.

We found that the coefficient of correlation for US and German stocks with Australian domestic returns was lower for unhedged market portfolios. This is positive for the risk reduction qualities of foreign investments. However, in the case of Japan, the correlation coefficient actually rose for unhedged returns compared with fully hedged returns. We found very low correlations between the performance of foreign markets and the performance of the currencies of those markets. It would be difficult to justify the use of any such perceived relationship as the basis of a currency policy.

CONCLUSION

The evidence suggests that the widely held views on the nature of the currency market are not particularly helpful in setting a policy on currency exposure management, when the alternatives are to be either fully hedged or unhedged. For the argument whether "to hedge or not to hedge", we must conclude that the appropriate policy will depend on many factors, including risk-aversion, time-frame, and the correlation of the international assets with other assets in the portfolio.

The definite part of our conclusion is: There are periods when being fully hedged is best and periods when being unhedged is best. It is clear that the truisms which have come to dominate the debate are not helpful in formulating a policy which will be robust in the day-to-day business of funds management. The next step is to develop a methodology for identifying skill, and a framework for comparing managers.

REFERENCES


