Original Article

Is active currency management effective for international equity portfolios involving managed futures and hedge funds?

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ABSTRACT **We assessed the potential benefit of using active currency management on international equity portfolio investment from Japan, British, Switzerland and the euro-regions that include bonds, managed futures and hedge funds assets in their respective international equity portfolios. Initially, these are US dollar-based portfolios. Our empirical studies using data from 2001 to 2006 show that active currency management converts US dollar back to Japanese yen better, and produce better average annual returns for the JPY portfolio. However, active currency management does not work well for the other European currency-based portfolios. It seems that using currency conversion by forward contract generates better local average annual portfolio returns for these other European portfolios. Regarding the effectiveness of including alternative investments and bond assets within the international equity portfolios, hedge funds appear to generate better average annual portfolio returns, followed by managed futures and then the bond index. We also observed using forward contracts on international equity portfolio included with hedge funds produce the best maximum annual returns.**

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Keywords: active currency management; hedge funds; currency spot rates; currency forward contracts; equity investment portfolio

INTRODUCTION

The use of active currency management activities has increasingly gained attention over the past years following market globalisation and increasing allocations to international assets. Investors owing international equities are faced with three options for managing currency risk. The first is to do nothing, that is, to accept the

return generated by an international equity portfolio when currency is unhedged. A second option is to reduce currency-specific fluctuation through a passive currency hedge by engaging in currency forward contracts. A third option, however, is to adopt active currency strategy to help to seek some excess return derived specifically from currency market positions. In this case, currency is viewed as a separate asset class that can be actively managed to help enhance values for the international equity assets portfolio, rather than as a source of risk.

Active currency management involves investigating whether short positions in foreign currency exposure (that is going for a short position in a currency forward contract, selling foreign currency and buying home currency contract), if taken conditionally on the basis of certain hedging rules signalling the extent of the depreciation of the particular foreign currency (or the appreciation of the home currency), provides an efficient method by which to reduce risk. Normally, forward rates will be used in the forecasting process. However, there are arguments for and against the use of active currency management.

Arikawa and Muralidhar[1] conducted a brief survey in this area. According to them, Fama,[2] Engel[3] and Sarno[4] argue against the use of forward rates, as they appear to be bad predictors of future spot rates' movement. However, Liu and He[5] and Levich and Rizzo[6] observed anomaly in the currency market giving rise to the presence of positive autocorrelation. This implies that currency markets could still trend, and simple trend-based strategies might still be profitable. Therefore, positive returns are in fact possible, given with a clearer understanding of the trending nature of the currency markets.

The strongest argument in support of active currency management involves the market micro-structure of the currency market. Huttman and Harris[7] observed that it is widely recognised among industry specialists that market participants such as the central bank or corporate treasurers might intervene in the market for purposes such as hedging or to improve the domestic macro-economic environment as in the case of the central bank, this provides the opportunity of pricing inefficiencies that may not exist in other capital markets.

Existing research on active currency management by Acar and Lequeux,[8] Reinert[9] and Dunis and Levy[10] appears to show that profits are attainable when hedging is undertaken, especially when persistent depreciation of the foreign currency is signalled by the conditional currency hedging rule. Such hedging rules are based on technical trend following the methods that generate signals to trigger a hedging or no-hedging decision.

DATA

Our empirical study assumes equity investors, holding MSCI EAFE and MSCI North American indexes portfolio, from Japan, the United Kingdom, Switzerland and the Euro regions to each includes the bond, the managed futures or the hedge funds asset or the hedge funds asset in their respective international equity portfolios. Hedge funds and managed futures funds investing were well developed over the years outside the United States, especially in European countries. In recent years, there has also been an increasing interest shown in emerging economies such as Japan and Hong

Kong. Therefore, we include the investors of Europe as well as Japan in this paper. www.hedgefundintelligence.com provides an up-to-date survey on the growth of hedge funds and managed futures investing in Europe and Asia.

The managed futures and the hedge fund indexes market data are from the Centre for International Securities and Derivatives Markets (CISDM, see http//cisdm.som.umass.edu). These are the CISDM Equal Weighted Hedge Fund Index and the CISDM Equal Weighted Commodity Trading Advisors Index. The bond, the MSCI EAFE and the MSCI North America indexes are from DataStream, Inc. These indexes, dated monthly, are for the period between 2000 and 2006. The MSCI EAFE and the MSCI North America indexes are the market capitalisation price indexes, whereas the Bond Index is the Lehman US Treasury Bond Index.

The currency data, include not only the monthly spot and forward data, but also the daily spot rate. The daily spot rate is needed here to formulate the dynamic hedging rule, which provides the basis for the monthly hedging decision. They are all reported on a foreign currency per home currency basis.

Our simple simulation exercise restricts the use of currency to a single country. We assumed our Japanese, British, Swiss and Euro-regions investors to engage only in assets in US dollar, which is the currency, the equity, bonds, managed futures and hedge funds data are based on. All our investors engage in three currency conversion methods. These are (1) the spot rate, (2) the forward contract and (3) the active currency management method. We also assume all the investors to equally weigh the assets in their portfolios.

METHODOLOGY

Technical trading rules based on moving average trend-tracing methods are widely used in currency markets. Acar and Lequeux[8] explain that the 'Buy' and 'Sell' signals generated by moving averages could be used to dynamically hedge the currency component of international assets. For instance, a German investor having invested in the United States might use the 'Buy' signal generated on deutsche mark futures contracts to repatriate the dollar investment into deutsche mark. When a 'Sell' signal is generated, the German investor will keep/regain his unhedged position that is implicitly short of German marks.

Using the above method of generating 'buying' and 'selling' signals to guide active currency management, we choose 32, 61 and 117 days as our three main moving averages orders. Active currency management can also be implemented by replicating currency benchmarking which is constructed for such a purpose. Thirty two, 61 and 117 moving average days were proven to be effective when used for active currency management benchmarking in the industry according to the research by Acar and Lequex.[8] They consider the correlations of moving average of 32, 61 and 117 days within the context of a portfolio of currency pairs of GBP/USD, USD/CHF, USD/YEN, USD/DEM, GBP/DEM, DEM/CHF and DEM/YEN. Acar and Lequex[11] equally weighted these three moving average days. We adopt the moving average of 32, 61 and 117 days, showing their results individually on the basis of single moving average each, rather than equally weighting them. This is to check for the consistency of performance of the various single-moving average-based strategies on the currencies used in this research.

We use the hedging criteria set out by Reinert[9] as a basis for active currency management. The first criterion is when the end-of-month spot exchange rate exceeds the moving average spot rate. The second criterion is when the average daily spot exchange rate (calculated end of the month, same day as the monthly spot rate closing value is reported) exceeds end-of-month spot rate.

The following defines the computation in relation to the hedging decision. R_i is the US dollar rate of return for the MSCI North America, MSCI EAFE index, the Bond, Managed futures or the Hedge Funds index. e_i is the returns as of the spot rate and f_i is the forward premium for the US dollar. The following explains the three currency conversion methods, namely the spot rate, the forward contract and the active currency management method.

Local returns using the spot rate market

$$R_i^e \equiv (1 + R_i)(1 + e_i) - 1 \qquad (1)$$

Local returns using the 1 month currency forward contract

$$R_i^f \equiv (1 + R_i)(1 + f_i) - 1 \qquad (2)$$

Local Returns using active currency management

$$R_i^A \equiv (1 + R_i)(1 + f_i) - 1$$
$$\text{if} \quad MA_i < Y_{jk} \leq \sum_{l=1}^{N} \frac{X_l}{N} \qquad (3)$$
$$(1 + R_i)(1 + e_i) - 1 \quad \text{Otherwise}$$

where,

MA_i = Moving average where i indicates the type of moving average; $i = 1$ refers to 32 days moving averages; $i = 2$ refers to 61 days moving averages; and $i = 3$ refers to 117 days moving averages.

Y_{jk} = End of month spot rate, with $j = 1$–12 and $k = 2000$–2006 for the years involved.

$\sum_{i=1}^{N} X_l/N$ = Spot rate monthly average, X_l is the daily spot rate, and N is the number of days in the month where spot rates are reported.

We use data from 2000 to 2006 for our analysis. The year of 2000 was used for estimating the initial length of the time period for the moving averages. We start our analysis beginning of 2001. Active currency management method entails that once a signal is generated, whereby, in this case, daily spot rates are used to help to generate a signal, we use it for the coming month, be it hedge or unhedge, and this is repeated monthly until November 2006, by which time the decision to hedge or unhedge is made for the month of December 2006. We compute the annual return by compounding the returns of its past 12 months and then comparing them across the three currency conversion methods.

EMPIRICAL ANALYSIS

Average annual portfolio returns

Using the simple moving averages days of 32, 61 and 117 days (hereafter 32MA, 61MA and 117MA accordingly) for the active currency management (hereafter AFX), and the spot rate and forward contracts currency conversion methods for the Japanese yen, Sterling pound, euro and the Swiss franc (hereafter, JPY, UK£, Euro and SF accordingly)-based portfolios, which consist of 'equity assets (hereafter, equity assets/portfolio are taken to mean assets/portfolios of MSCI EAFE and MSCI North American indexes) and the bond, managed

futures, or the hedge funds assets, we computed the portfolio returns in their respective local currencies. These portfolio returns are the average monthly-compounded annual returns (hereafter, average annual returns) from 2001 to 2006. Figure 1 shows the comparison of these four currency-denominated portfolio returns, computed for the (1) EAFE/North America/ bonds assets portfolio, (2) EAFE/North America/managed futures assets portfolio and (3) EAFE/North America/hedge funds assets portfolio.

Of the four currency-based portfolio returns, the JPY-based portfolio is the only one showing average annual returns generated from AFX capable of out-performing the spot rates and the forward contracts. Using the 32MA AFX has helped the JPY-based equity portfolio with bond asset to produce average annual returns about two times higher when compared to using the spot rates and about six times higher when compared to the forward contract. For equity portfolios using managed futures (hedge funds), 32MA AFX manages to average annual portfolio returns between 1.51 (1.47) and 3.16 (2.87) times better when compared to using spot rates and forward contracts.

The other European-based currencies based portfolios, appear to show that forward contracts generate better average annual returns than the spot rates or any of the AFX moving average days. In fact, using the forward contract for the UK-£, euro- and SF-based currency portfolios could achieve average annual portfolio returns as good as those achieved by using AFX for the JPY-based portfolio. Forward contracts appear to help enhance returns better for the euro-based portfolio than for the UK-£ or the SF-based portfolio in most equity portfolios whereby the bond, managed futures and hedge funds assets are included. For example, for euro-based equity portfolio using bond assets, currency conversion by forward contract produced average annual returns of 13.57 per cent. This is higher than the cases of UK-£ and SF-based equity portfolios using bonds assets, which are 9.81 per cent and 10.62 per cent, respectively.

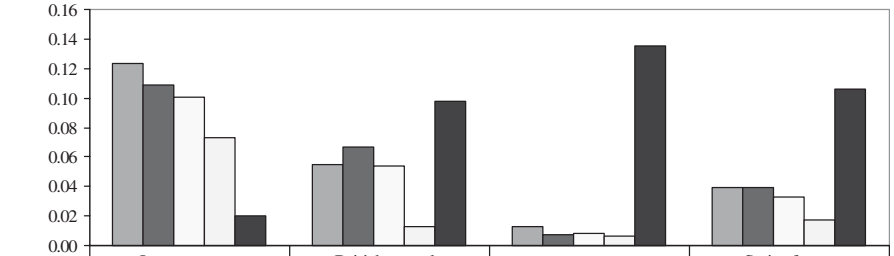
32MA AFX convert better average annual returns for the JPY-based portfolio, but they are lower than the euro-based portfolios when currency conversion by forward contract is adopted. For example, for the euro-based equity portfolio using hedge funds, although 32MA AFX has helped JPY-based portfolio to gain average annual return of 16.3 per cent, currency conversion by forward contract managed to produce average annual return of 17.67 per cent for the euro-based equity portfolio using hedge funds.

The above provides a general discussion on the average annual portfolio returns over the 6-year periods for all the four currency-type portfolios. Investigation into other related statistics should help investors further qualify the effectiveness of the currency conversion methods. Table 1 gives the summary statistics in relation to the monthly compounded annual returns from 2001 to 2006.

DESCRIPTIVE STATISTICS FOR AVERAGE ANNUAL RETURNS

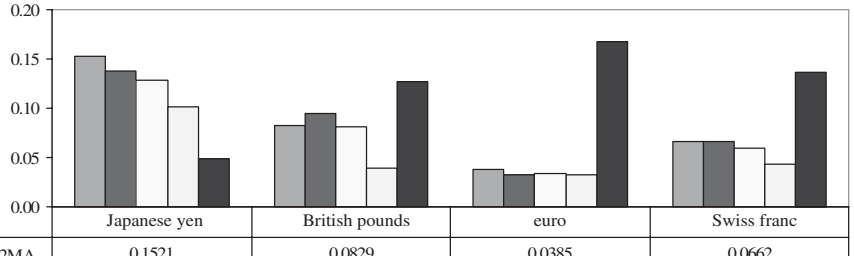
The JPY-based portfolio

As discussed earlier, the JPY portfolios have benefited from the 32MA AFX, as it has enhanced its average annual portfolio returns. However, Table 1 (A) reveals that in terms of maximum annual returns, currency conversion



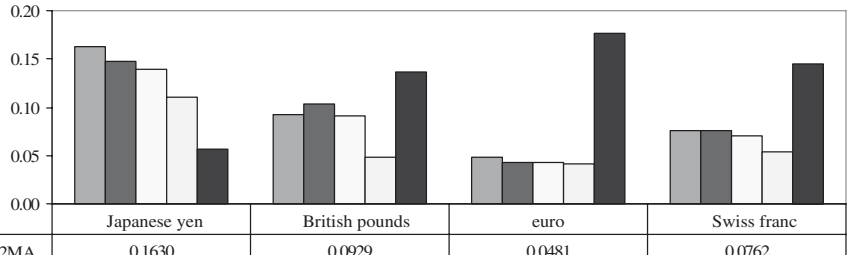
	Japanese yen	British pounds	euro	Swiss franc
32MA	0.1237	0.0548	0.0128	0.0392
61MA	0.1089	0.0664	0.0069	0.0392
117MA	0.1002	0.0536	0.0085	0.0332
Spot	0.0735	0.0128	0.0063	0.0176
forward	0.0198	0.0981	0.1357	0.1062

Currency conversion methods comparison:
EAFE/North America/Bond portfolio



	Japanese yen	British pounds	euro	Swiss franc
32MA	0.1521	0.0829	0.0385	0.0662
61MA	0.1375	0.0944	0.0327	0.0662
117MA	0.1284	0.0813	0.0340	0.0600
Spot	0.1008	0.0390	0.0318	0.0437
forward	0.0481	0.1275	0.1671	0.1365

Currency conversion methods comparison:
EAFE/North America/Managed Futures portfolio



	Japanese yen	British pounds	euro	Swiss franc
32MA	0.1630	0.0929	0.0481	0.0762
61MA	0.1481	0.1041	0.0421	0.0762
117MA	0.1388	0.0907	0.0434	0.0698
Spot	0.1109	0.0485	0.0415	0.0540
forward	0.0567	0.1371	0.1767	0.1453

Currency conversion methods comparison:
EAFE/North America/Hedge funds portfolio

Figure 1: Comparison of average monthly compounded annual portfolio returns, in the Swiss franc, euro, Japanese yen and Sterling pound portfolios from 2001 to 2006, equally weighted consisting of MSCI EAFE, MSCI North America and the bond, managed futures or the hedge fund Indexes.

Table 1: Summary statistics of the monthly-compounded annual portfolio returns (consist of equally weighted MSCI EAFE, MSCI MSCI North America and either the Bond, Managed Futures or the Hedge Funds indexes) across different currency conversions

	32MA	*61MA*	*117MA*	*Spot rates*	*Forward*		*32MA*	*61MA*	*117MA*	*Spot rates*	*Forward*
(A) Japanese Yen Den Denominated Portfolio						(B) Sterling Pound Denominated Portfolio					
EAFE/North America/Bond portfolio						*EAFE/North America/Bond portfolio*					
Mean	0.1237	0.1089	0.1002	0.0735	0.0198	Mean	0.0548	0.0664	0.0536	0.0128	0.0981
SD	0.1625	0.1425	0.1365	0.1387	0.2125	SD	0.1555	0.1269	0.1190	0.1306	0.1567
Max	0.2709	0.2201	0.2084	0.1892	0.4033	Max	0.2861	0.2433	0.2163	0.1568	0.3333
Min	−0.1885	−0.1673	−0.1673	−0.2001	−0.1950	Min	−0.1735	−0.1258	−0.1258	−0.2028	−0.0554
Median	0.1496	0.1451	0.1367	0.1217	−0.0175	Median	0.0457	0.0746	0.0672	−0.0027	0.0721
EAFE/North America/Managed Futures portfolio						*EAFE/North America/Managed Futures portfolio*					
Mean	0.1521	0.1375	0.1284	0.1008	0.0481	Mean	0.0829	0.0944	0.0813	0.0390	0.1275
SD	0.1626	0.1477	0.1400	0.1406	0.2324	SD	0.1687	0.1375	0.1298	0.1363	0.1717
Max	0.2877	0.2808	0.2438	0.2050	0.4731	Max	0.3501	0.3052	0.2769	0.1993	0.3996
Min	−0.1640	−0.1421	−0.1421	−0.1759	−0.1802	Min	−0.1485	−0.0993	−0.0993	−0.1787	−0.0268
Median	0.1886	0.1697	0.1611	0.1451	0.0088	Median	0.0651	0.0942	0.0847	0.0187	0.0922
EAFE/North America/Hedge Funds portfolio						*EAFE/North America/Hedge Funds portfolio*					
Mean	0.1630	0.1481	0.1388	0.1109	0.0567	Mean	0.0929	0.1041	0.0907	0.0485	0.1371
SD	0.1873	0.1743	0.1664	0.1649	0.2481	SD	0.1919	0.1624	0.1544	0.1601	0.1931
Max	0.3177	0.3136	0.2756	0.2330	0.5108	Max	0.3847	0.3385	0.3095	0.2300	0.4354
Min	−0.2020	−0.1811	−0.1811	−0.2134	−0.1820	Min	−0.1872	−0.1403	−0.1403	−0.2160	−0.0710
Median	0.2025	0.1916	0.1828	0.1545	−0.0039	Median	0.0873	0.1171	0.1077	0.0378	0.1148
(C) Euro Denominated Portfolio						(D) Swiss Franc Denominated Porfolio					
EAFE/North America/Bond portfolio						*EAFE/North America/Bond portfolio*					
Mean	0.0128	0.0069	0.0085	0.0063	0.1357	Mean	0.0128	0.0392	0.0332	0.0176	0.1062
SD	0.1464	0.1410	0.1534	0.1492	0.2349	SD	0.1464	0.1816	0.1652	0.1623	0.1989
Max	0.2202	0.2202	0.2643	0.2060	0.5288	Max	0.2202	0.3123	0.2629	0.2067	0.4117
Min	−0.2350	−0.1810	−0.1810	−0.2568	−0.1027	Min	−0.2350	−0.1517	−0.1779	−0.2714	−0.1355
Median	0.0181	0.0080	0.0157	0.0233	0.1244	Median	0.0181	0.0004	−0.0178	0.0242	0.1086
EAFE/North America/Managed Futures portfolio						*EAFE/North America/Managed Futures portfolio*					
Mean	0.0385	0.0327	0.0340	0.0318	0.1671	Mean	0.0385	0.0662	0.0600	0.0437	0.1365
SD	0.1469	0.1436	0.1534	0.1495	0.2560	SD	0.1469	0.1876	0.1718	0.1662	0.2172
Max	0.2364	0.2364	0.2811	0.2221	0.6048	Max	0.2364	0.3297	0.2796	0.2228	0.4819

Table 1 *Continued*

	32MA	*61MA*	*117MA*	*Spot rates*	*Forward*		*32MA*	*61MA*	*117MA*	*Spot rates*	*Forward*
Min	−0.2118	−0.1562	−0.1562	−0.2343	−0.0907	Min	−0.2118	−0.1260	−0.1530	−0.2494	−0.1240
Median	0.0374	0.0296	0.0422	0.0428	0.1520	Median	0.0374	0.0219	0.0033	0.0462	0.1381
EAFE/North America/Hedge Funds portfolio						*EAFE/North America/Hedge Funds portfolio*					
Mean	0.0481	0.0421	0.0434	0.0415	0.1767	Mean	0.0481	0.0762	0.0698	0.0540	0.1453
SD	0.1697	0.1670	0.1759	0.1720	0.2733	SD	0.1697	0.2102	0.1946	0.1898	0.2324
Max	0.2652	0.2652	0.3109	0.2505	0.6459	Max	0.2652	0.3607	0.3095	0.2512	0.5198
Min	−0.2476	−0.1945	−0.1945	−0.2691	−0.0696	Min	−0.2476	−0.1657	−0.1915	−0.2835	−0.1036
Median	0.0479	0.0489	0.0618	0.0525	0.1391	Median	0.0479	0.0410	0.0221	0.0658	0.1248

by forward contract appears to be better for all three JPY equity portfolios included with the bonds, managed futures or hedge funds assets. Forward contract produce maximum returns as high as 51 per cent, when hedge fund asset is used within the equity portfolio. AFX seems to be better in producing minimum returns than the spot rate or the forward contracts. For example, for equity portfolio using managed futures assets, the minimum annual returns using AFX were −16.4 per cent (32MA), −14.21 per cent (61MA) and −14.21 per cent (117MA) compared to the spot rate and the forward rate, which were −17.6 per cent and 18.02 per cent.

Fluctuations (standard deviation) of the annual returns were also observed to be quite similar among the various AFX methods. For example, they are between 13.65 per cent and 16.25 per cent for equity portfolios using bonds assets. However, they are as high as 21 per cent when forward contracts are used on the same portfolios.

Therefore, the forward contracts, although produce higher maximum annual returns for JPY portfolios, also have higher standard deviations. The higher standard deviations of using forward contracts are also supported by the low median returns, as reported in Table 1(A). These are −1.75 per cent, 0.8 per cent and −0.39 per cent for the equity portfolio using the bonds, managed futures and the hedge funds assets, respectively. Median returns, however, were higher for the JPY using the AFX. For example, for equity portfolios using hedge funds, median returns were 20.25 per cent (32MA), 19.16 per cent (61MA) and 18.28 per cent (117MA). However, the median return of the same portfolio was only −0.39 per cent when converting the currency by forward contracts.

The UK-based portfolio

For UK-based portfolio, earlier discussion shows that the average annual portfolio returns appear

to be better when using the forward contracts. Table 1(B) shows that forward contract produce higher maximum annual returns for the UK-based portfolio, when compared with other currency conversion methods, especially for equity portfolio, included with hedge funds, where the maximum return is 43.5 per cent. Forward contract also produced better minimum annual return for UK investors. The best return was −2.68 per cent, when the equity portfolio was included with managed futures.

However, the standard deviations of portfolio returns using forward contracts were not extremely different compared to other currency conversions methods, although the standard deviations of returns of these other methods were mostly lower than those of the forward contracts. The largest difference in the standard deviations is about 3.87 per cent. This is when 117MA AFX is used for the equity portfolio included with hedge funds, whereby the standard deviation is 15.44 per cent, compared to forward contracts, which is 19.31 per cent.

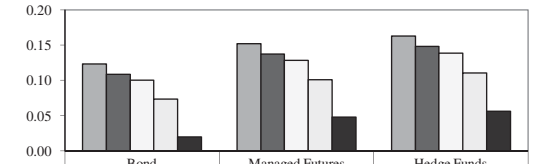
As for median returns, there were also no big difference between the forward contracts and other currency conversion methods. However, it is observed that 61MA AFX out-performs the forward contracts for equity portfolios is included with the bonds, managed futures or hedge funds, although it is only different by 0.25 per cent in most cases. This perhaps explains why 61MA AFX produced relatively higher average annual returns, compared with the other moving average days. However, 61MA AFX generated much lower average annual return when compared with forward contracts. This is due to the relatively lower maximum returns and lower minimum returns of 61MA AFX compared with the forward contract.

The euro-based portfolio

As shown in Table 1(C). Forward contract has also helped the euro-based portfolio to achieve much higher maximum annual returns, and higher minimum annual returns, despite having a higher standard deviation of more than 20 per cent for equity portfolios included with the bonds, managed futures or the hedge funds. Currency conversion by forward contract for the euro portfolios gave higher median returns of more than 10 per cent in all portfolios, compared to between 1 per cent and 6 per cent achieved by other currency conversion methods on the same portfolio. To some extent, this justified the effectiveness of forward contract for currency conversion on the euro portfolios between 2001 and 2006.

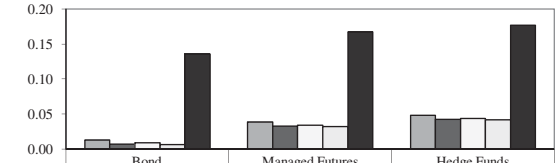
The SF-based portfolio

Like the euro-based portfolio, as shown in Table 1(D), currency conversion by forward contract on the SF-based portfolios also bring much higher maximum return and higher minimum returns compared with other currency conversion methods. Although the standard deviation is higher for the forward contracts of the SF-based portfolios, the SF-based portfolios also have higher median returns, between 10 per cent and 13 per cent. This is higher compared to portfolios using other currency conversion, where the median returns range between −1.7 per cent and 6.6 per cent. This reveals that using forward contract on the SF-based portfolio has helped



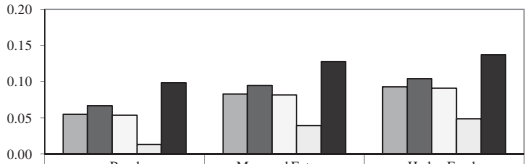
	Bond	Managed Futures	Hedge Funds
32MA	0.1237	0.1521	0.1630
61MA	0.1089	0.1375	0.1481
117MA	0.1002	0.1284	0.1388
Spot	0.0735	0.1008	0.1109
forward	0.0198	0.0481	0.0567

Currency conversion comparison: JPY based Investors



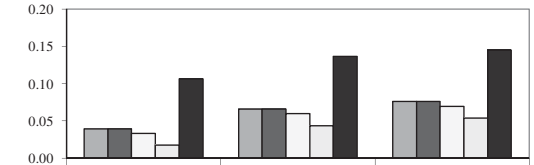
	Bond	Managed Futures	Hedge Funds
32MA	0.0128	0.0385	0.0481
61MA	0.0069	0.0327	0.0421
117MA	0.0085	0.0340	0.0434
Spot	0.0063	0.0318	0.0415
forward	0.1357	0.1671	0.1767

Currency conversion comparison: Euro based Investors



	Bond	Managed Futures	Hedge Funds
32MA	0.0548	0.0829	0.0929
61MA	0.0664	0.0944	0.1041
117MA	0.0536	0.0813	0.0907
Spot	0.0128	0.0390	0.0485
forward	0.0981	0.1275	0.1371

Currency conversion comparison: UK£ based Investors



	Bond	Managed Futures	Hedge Funds
32MA	0.0392	0.0662	0.0762
61MA	0.0392	0.0662	0.0762
117MA	0.0332	0.0600	0.0698
Spot	0.0176	0.0437	0.0540
forward	0.1062	0.1365	0.1453

Currency conversion comparison: SF based Investors

Figure 2: Comparison of average annual portfolio returns, equally weighted consisting of MSCI EAFE, MSCI North America and the bond, managed futures or the hedge fund Indexes.

reduce the fluctuation of minimum annual returns to between −10.36 per cent (for equity portfolio with hedge funds) and −13.55 per cent (for equity portfolio with the bonds asset), whereas those of other currency conversion methods have seen minimum annual returns fluctuating between −12.6 per cent (for 61MA AFX on equity portfolio with managed futures) and −28.35 per cent (using spot rates on equity portfolio with hedge funds) for the SF-based portfolio.

We have now discussed the effectiveness of the currency conversion methods for all currencies-types portfolios. We should now discuss the effect on average annual portfolio returns by including bonds, managed futures and hedge funds in the equity portfolio. Figure 2 gives the details.

DISCUSSING THE EFFECTIVENESS OF USING ALTERNATIVE INVESTMENT AND BOND ASSETS

Figure 2 shows that, for all currency-based portfolios, the inclusion of hedge funds in the equity portfolios produced the best average annual returns, followed by managed futures and then the bond assets. However, comparing the four currency-based portfolios show some differences in the returns. For the JPY portfolios, 32MA AFX produced the best returns, when compared with other currency conversion methods used on the same JPY portfolios respectively.

For the UK£ portfolio, forward contract is the best conversion method for each portfolio but, 61MA AFX appears to do the best among

all moving average days. It appears 61MA is the best specification among all other moving average days, in capturing returns' predictability for the UK£ portfolio.

For the euro-based portfolio, forward contract produced far better average annual portfolio returns than the other currency conversions for the portfolios. The moving average days used for AFX also do not appear to have captured returns well, compared with the UK£ portfolios, resulting in lower returns. Currency conversion (except for forward contract) for the euro-based portfolio produced lower average annual returns compared with the other currency-based portfolios. For example, the average annual portfolio returns for the equity portfolio using the bond asset is only about 1 per cent.

In the case of the SF-based portfolio, the forward contract again out-performs all other currencies conversion methods for the portfolio. Interestingly, the average annual returns of the portfolio are the same for 32MA and 61MA for AFX in all portfolios. There is a chance annual returns generated using 32MA AFX and 61MA AFX are quite similar to each other. This shows the moving average days used for the SF portfolio might not have captured variability in the returns pattern as well as they should. There might therefore be a trading model specification issue for the SF portfolio on producing better returns.

SUMMARY AND CONCLUSION

In this paper, we assessed the potential benefit of using active currency management for Japan, British, Switzerland and the euro-regions investors that include bonds, managed futures and hedge funds in their respective international equity portfolios. These are all US dollar-based, and our empirical studies using data from 2001 to 2006 show that active currency management appears to convert US dollar back to Japanese yen better, and produce better average annual returns for the JPY portfolio. However, active currency management does not work well for the other European currency-based portfolios. It seems that using currency conversion by forward contract generates better local average annual portfolio returns for these other European portfolios. Regarding the effectiveness of including alternative investments and bond assets within the international equity portfolios, hedge funds appear to give better average annual portfolio returns, followed by managed futures and then the bond index. We also observed using forward contracts on international equity portfolio included with hedge funds makes it possible to produce much higher maximum annual returns.

The huge contrast between the effectiveness of using active currency management on the European and the Japanese portfolio may be because of the degree of the currencies' movement and patterns underlying their respective portfolios. Comparing the lowest value of the exchange rates, from 2000 to 2006, with the latest figures at the end of December 2006, the Sterling pound£, Swiss franc and euro have appreciated 36 per cent, 40 per cent and 45 per cent accordingly. However, the Japanese yen only appreciated 12 per cent. Even so, it is widely believed at the time the Japanese yen is undervalued, especially against the US dollar, according to the Economist.[12] This implies that the US dollar is much more overvalued against the Japanese yen in the periods under study.

To conclude, our research findings show that using active currency management was beneficial to an international equity portfolio for Japanese investors from 2001 to 2006, especially when used with hedge funds. Our trading model adopted from Reinert,[9] although works well for the JPY portfolio, is not effective on the various European currency-based portfolios. This is to be expected, as according to the latest research by Arikawa and Muralidhar,[1] the effectiveness of trading models can be affected by the underlying currency's movement and trending patterns. Obviously, one would expect trending patterns to be different among currencies where the degrees and magnitudes of movements may differ from one another. It is therefore possible that the same trading model might not work equally well on all currencies concerned. Therefore, the model used in this paper would benefit from further development. This includes the incorporation of algorithms on the specification of the model to capture efficiently the varying degrees of potential appreciation or deprecation of the foreign currency against the home currency. This future research area will be of significant importance to multi-currency assets portfolios, in which the extent of the similarities or differences among the underlying currencies movements and magnitudes will have a much larger impact and implications.

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