Mutual Fund Performance and Management Location

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Abstract *In this paper we develop and explore the most comprehensive database of fund manager performance delineated by location. We use this database and four performance evaluation techniques to determine whether a fund manager's location relative to the location of the securities they manage are listed and traded, has any impact on fund performance. The main results of our paper are very positive for the US fund management industry. Any investor wishing to invest in a US equity mutual fund would be well advised to have this portfolio managed by a manager based in the US. Compared with European managers of US equity mutual funds, US managers produce higher mean alpha and display a far greater tendency for positive performance persistence.*

Keywords*:* Mutual fund location; performance persistence; market timing; returns-based style analysis
JEL classification: G10; G20

1. Introduction

Shukla and van Inwegen (1995) argue that managers that manage assets in the locality in which they are traded should be at an informational advantage to managers that manage the same assets but from another financial centre. They suggest that these informational advantages may come in a variety of forms. For example, 'local' managers may be able to benefit from local knowledge and contacts that foreign managers may not have easy access to. This knowledge might derive from the ease with which company visits can be made, or from closer relationships with local market participants such as brokers, investment bankers. Shukla and Inwegen argue that this might in turn lead to the '*preferential treatment'* of local managers compared to foreign managers '*in terms of research, execution of trades, and even access to initial public offerings (IPOs)*'.

The possibility that there might be a relationship between the financial centre where securities are listed and traded and the location of the manager managing them, has potentially important implications for both investors and fund management companies. In particular, the possibility of such a relationship raises the following two questions. If an investor wishes to invest in a US equity mutual fund, should they trust their money to a manager based in London or to one based in New York or Boston? And if, say, a London-based fund management company wishes to launch a US equity mutual, can this fund be run efficiently from their London office or do they need to go to the considerable expense of setting up a subsidiary in, say, Boston? Any finding that, for example, established that US-based managers managing US equities consistently outperformed managers of US equities based outside of the US would naturally suggest that non-US based fund management companies should consider either setting up offices in the US, or perhaps entering into 'white-labeling' agreements with US fund management companies.

We test the hypothesis that the location of fund managers and the financial centres in which the securities are listed and traded has an impact upon fund performance by constructing a database of fund managers in two different regions: the USA and Europe. We spent a great deal of time making sure that we could identify the location from which any fund in our dataset was managed. For example, a very large number of funds that were classified as being managed abroad at first glance had to be removed from the dataset because they were in fact managed in the market in which they were investing in. We discovered that the 'domicile' of a fund is a poor proxy for the location in which the fund was managed. For example, a fund might be domiciled in Ireland but actually managed in the US. To identify the management location precisely we used a combination of location (rather than domicile) information derived from Morningstar plus internet searches of fund manager websites. The dataset we used for this study consisted of 3,831 'locally managed' and 714

'overseas managed' funds, spanning the period from 1970 to 2010. Another strength of this study then is the much more comprehensive nature of our dataset in terms of both numbers of funds and time span.

As well as constructing a more comprehensive dataset to analyse the 'location hypothesis' we also analysed this hypothesis in a more comprehensive manner. We make two main location comparisons. First, we compared the performance of managers managing the same securities but in different locations, for example, comparing US and European managers of US equities. We refer to this as the '*management location*' comparison. The second comparison that we make, we refer to (for the want of a better description) the '*market*' comparison. Here we compare the performance of managers based in the same location, but managing funds either traded and listed in this location, or traded and listed abroad. For example, this might involve comparing US-based fund managers managing portfolios of US equities and US-based fund managers, managing European equities.

To make these various sets of performance comparisons we make use of a number of techniques. We estimate the alphas of funds in our sample using both CAPM, single factor and Fama and French (Fama and French (1993)) three factor models, to ascertain whether location has an impact on alpha generation. Using the Treynor-Mazuy approach (Treynor and Mazuy (1966)) we also test whether location has an impact on market timing abilities of fund managers. We also test whether location has an impact on performance persistence by implementing the recursive portfolio formation technique used to investigate this phenomenon by Hendricks, Patel, and Zeckhauser (1993). Finally, we use returns-based style analysis (RBSA) to ascertain whether location has any impact on investment styles.

The main results of our paper suggest that any investor wishing to invest in a US equity mutual fund would be well advised to have this portfolio managed by a manager based in the US. Compared with European managers of US equity mutual funds, US managers produce higher mean alpha, and display a greater tendency for positive performance persistence, indeed, European-based managers of US equity mutual funds show a marked proclivity for producing negative performance persistence. In addition, and consistent with the location hypothesis, using RBSA we find that local managers tend to have a higher style exposure to small cap stocks relative to large cap stocks compared with foreign managers of the same equities.

The rest of this paper is organised as follows. In section 2 we review the relatively short literature on this topic; in section 3 we present a description of our carefully constructed database; in section

4 we discuss the methodologies that we have chosen to make the comparison between different sets of managers; in section 5 we discuss our results; and we conclude the paper in section 6.

2. Literature Review

The question of whether a manager's location influences fund performance has received relatively little attention in the literature. A simple hypothesis might be that local managers of assets would have certain informational advantages over managers that are not located where their assets are located and traded. For example, managing UK equities in London may give local managers a level of access to company management that managers in New York could not hope to emulate. Fletcher (1999) analyses the performance of UK mutual funds investing in US equities. He examines 85 UK equity funds managed in the UK from January 1985 to December 1996. He uses basic conditional and unconditional performance evaluation measures, and finds no evidence of significant abnormal returns relative to appropriate benchmarks.

Other researchers have carried out a more direct comparison. Shukla and van Inwegen (1995) examine 108 US funds and 18 UK funds, all investing in US equities, for the period June 1981 to May 1993. They control for the effects of tax treatment, fund objectives, currency risk and investment style. Using the CAPM model and some of its associated performance measures including Sharpe, Treynor and Jensen's alpha, and timing ability tests, they found that the average Sharpe ratio was 0.13 for US funds and 0.08 for UK funds and that the average Treynor index was 0.006 for US funds and 0.004 UK funds. The difference between the Sharpe and Treynor ratios in both countries were statistically significant. The average Jensen alpha was -0.04% for US funds, whereas the UK average was found to be -0.22%. The researchers found that only 5.56% of UK funds had positive alphas compared to 42.6% of US funds. Using the Treynor and Mazuy (1966) model to test for timing ability, they found that 0.0% and 5.7% of the gamma parameters were both positive and significant for the UK and US managed funds respectively. From this evidence they conclude that US managers of US equities significantly outperform UK managers of US equities, and attribute this outperformance mainly to informational advantages that derive from locality. These advantages might relate to local knowledge and contacts, ease of making company visits, time zone advantages and connections and relationships with market participants such as brokers, investment bankers etc which may in turn 'accord them preferential treatment in terms of research, execution of trades, and access to initial public offerings (IPOs)'. They also attribute some of the difference to fund size: the UK-based US equity funds in their sample were much smaller than their US-based equivalents.

Otten and Bams (2007) study the performance of both US and UK-based US equity funds. Using a sample of 2,436 US funds and 95 UK funds, with monthly returns data from January 1990 to December 2000, they use more elaborate multi-factor models than Shukla and van Inwegen (1995) to assess performance. As well as employing the more traditional CAPM-based models and a multi-factor model allowing for size, value and momentum effects, Otten and Bams also use a conditional multi-factor model. In order to make an adequate comparison of funds across two different locations, they control for the effects of tax treatment, fund objectives and investment style. The authors found no evidence of the expected outperformance of US-based funds, in any of the models that they employed. In fact, they found that UK-based funds slightly outperformed their US equivalents, in the small company segment. If local informational advantages do play some role in performance differentials of this kind, one would expect that that local knowledge would be particularly advantageous in the case of small stocks.

The existing studies of the impact of location on fund performance have all used a relatively small sample of 'foreign funds', essentially, UK-based funds managing US equities, and have not explored the related question of whether US-based managers have been at an informational disadvantage in managing, say, UK equities. One of the problems hampering such studies in the past has been the lack of readily available information on the location of the manager. In this paper we have put extensive effort into expanding the size of the data set for analysis to address these and other issues. We now move on to describe our carefully constructed database.

3. Data

The equity mutual fund returns used in this study were all collected from Morningstar Inc. All fund returns are end month, and span various horizons from January 1970 to June 2010. Non-surviving funds are also included in the database to account for any survivorship bias. A non-surviving fund is one which has existed for some time during the sample period but has not 'survived' until the end of the sample period. These funds do not survive for a variety of reasons, for example, due to a merger with another fund or due to closure as a result of bad performance. In total the database consists of the returns on 4,545 funds, which includes 714 funds which are not traded in the same location as the manager. We refer to these as 'foreign funds'. The remaining funds we refer to as 'local funds'.

As discussed in the introduction, each fund was examined to ensure that those classed as 'foreign' were in fact managed in the remote market. This was carried out using a combination of the fund information statistics provided by Morningstar and internet-based checks on the fund manager's

website to ensure that we knew the location of the manager's desk. In other databases, a fund is classified as 'foreign' if it is domiciled in a different country to the market it is investing in. However, Morningstar's database identifies both the domicile of the fund and the fund manager's location. Although a time consuming process, by examining each fund's management location and then confirming this by using the fund management company's website we were able to classify the location of the funds' management precisely[1]. This detailed examination by fund was deemed vital because a number of funds were not managed where they were domiciled. For example, the Henderson European Focus A was classified as being foreign (investing in European equity and managed in the US) because its domicile was listed as the United States. However, Morningstar manager location information and the fund manager's website both confirmed that this fund was managed out of London and not out of the US. Other common databases such as Thomson Financial seem to use domicile as a proxy for management location, which could result in biased results.

All funds in the dataset are unique. By this we mean that any merged, split or combined funds were excluded to ensure that no duplicates are present. 'Second units' were also removed from the dataset. 'Second units' are essentially the same fund packaged in a different way and sold to different types of investors (such as retail or institutional investors) – it is therefore also a duplicate fund. The fund returns used are before (gross) buying and selling expenses and after (net) annual management fees. The calculated monthly returns are gross of any income tax so that the results are not distorted by tax differentials between locations. Finally, all returns are inclusive of reinvested income.

The data set consists of 2,265 US-based funds investing in US equities (US/US); 685 European-based funds investing in US equities (EU/US); 1,567 European-based funds investing in European equities (EU/EU); and 28 US-based funds investing in European equities (US/EU).

We use this database to make two key comparisons. We compare the performance of local versus foreign managers of US equities; and the performance of local versus foreign managers of European equities. In the case of the former the analysis is undertaken in terms of USD and using financial market benchmarks derived from the US financial markets, and in the case of the latter the analysis is conducted in Euros, using appropriate financial market indices from European financial markets.

[1] In total we found that approximately 7.5% of the original, full sample of Morningstar funds that we analysed were not managed in the location indicated in the database.

These comparisons, which we refer to as 'location comparisons', allow us to say something about the impact of location on fund performance.

We then also conduct a kind of intra-market comparison. We compare the performance of US-based managers of US equities with the performance of US-based managers of European equities. In a similar vein, we compare the performance of European-based managers of European equities with that of European-based managers of US equities. All returns and financial market indices are appropriately currency adjusted. This second set of comparisons, which we refer to as 'market comparisons' (simply to distinguish the analysis from the 'location comparisons') allows us to compare the quality of managers of domestic and foreign funds in the US and in Europe. As far as we are aware, no similar comparison has been performed before. Only funds that have at least 36 monthly return observations are used in the analysis. We tested the robustness of this minimum criterion by increasing the minimum number of observations to 60 and decreasing it to 24.

In the next section of this paper, we will describe our methodology which naturally requires the use of benchmark indices. We make use of the CAPM, the Fama and French three factor model, and returns-based style analysis. Table 1 shows all the sources of the indices needed to undertake this analysis. All US indices were available for the full span of the study, but some of the European indices were only available from 1990. Where necessary, indices were converted to the appropriate currency at the appropriate rate. Where no general European index existed, a German Deutschmark index was used as a proxy. All indices were monthly and had income reinvested (total returns) in order to match the actual fund returns.

4. Methodology

4.1. Testing for differences in alpha generation

To test whether location has a material effect on alpha generation, we compare sets of managers by making use of a version of the CAPM and of the Fama and French three factor model. We calculate Jensen's alpha for the funds in our dataset by estimating the following regression:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_p\left(r_{m,t} - r_{f,t}\right) + \varepsilon_{p,t} \qquad (1)$$

where r_p is the total return of portfolio p, α_p is Jensen's alpha, r_f is the risk-free rate, r_m is a proxy for the return on the market, β_p is the portfolio's beta coefficient and ε_p is a white noise error term. The calculation of Jensen's alpha is a way of determining whether a portfolio is earning excess return

for the level of risk assumed. If the value is positive and significant, then the portfolio is earning excess return. A positive statistically significant alpha is interpreted in this paper as indicating that the portfolio is benefiting from manager skill. In other words, a fund manager has "added value" with their investment strategy.

We also use the Fama and French three factor model as an alternative to the CAPM (see Fama and French (1993)). This model examines portfolio performance by controlling for additional risk factors, that is size and value versus growth factors. The model can be written as follows:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_p(r_{m,t} - r_{f,t}) + \beta_s(SMB_t) + \beta_y(HML_t) + \varepsilon_{p,t} \quad (2)$$

where β_s represents the beta coefficient on the SMB 'small (market capitalization) minus big' factor and β_y represents the beta coefficient on the HML 'high (book value/price) minus low' factor. The SMB factor was constructed for both the US and European markets by subtracting the return on a large cap index from the return on a small cap index. The HML factor for both markets was constructed by subtracting the return on a growth index from the return on a relevant value index.

We collate mean alphas and betas of these two factor models along with corresponding t-statistics. We report the number of positive and negative significant alphas**.** As well as the value of mean alpha (the higher the better), the performance of a particular sector is judged on the number of managers generating significant alpha (again the higher the better). This information helps to address the two basic hypotheses of this paper, that is that local managers generate superior returns (have higher alphas) than equivalent foreign managers of the same set of equities, and that managers of local equities are expected to perform better than managers of foreign equities when they are both managed from the same location.

4.2. Testing for market timing differences

We make use of the Treynor and Mazuy (1966) method to test for differences in market timing ability between different sets of fund managers. This method involves estimating the following regression:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_p(r_{m,t} - r_{f,t}) + \gamma_p(r_{m,t} - r_{f,t})^2 + \varepsilon_{p,t} \quad (3)$$

here γ_p represents the coefficient that captures a manager's market timing ability. A positive and significant gamma coefficient is indicative of the manager being able to 'time the market', that is, increase the fund's beta in a rising market and reducing it in a falling market environment. We also estimated a Fama and French enhanced version of this model as follows:

$$r_{pt} - r_{ft} = \alpha + \beta_p(r_{mt} - r_{ft}) + \beta_s(SMB_t) + \beta_y(HML_t) + \gamma_p(r_{m,t} - r_{f,t})^2 + \varepsilon_{pt} \quad (4)$$

The hypothesis that we wish to test is whether managers of locally managed funds have better market timing abilities as a result of possible informational advantages. To gather evidence on this issue we examine the average gamma estimates (the higher the better) and the number of managers generating significant gamma (again, the higher the better), for different groups of fund managers.

4.3. Testing for differences in mean alphas and gammas

We wish to establish whether location has an impact on average fund performance, and we try to ascertain evidence for this possible phenomenon by estimating alpha and gamma coefficients as described above. To test for difference between mean statistics (alpha or gamma) we used a test for differences between means described in Freund (2003) and given as:

$$z = \frac{\bar{x}_1 - \bar{x}_2 - \delta}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \quad (5)$$

where $\bar{x}_1$ is the mean variable (alpha or gamma) and $\sqrt{\sigma_1^2}$ is the variance from sample 1 and $\bar{x}_2$ is the mean variable (alpha or gamma) and $\sqrt{\sigma_2^2}$ is the variance from sample 2, n is the number of observations in the sample and δ is a given constant, 0 in this case. Thus, the null hypothesis of the test is that $\overline{x_1} - \overline{x_2} = 0$.

We also implement the Kolmogorov-Smirnov test (Massey, 1951) which allows us to examine the difference between the distributions of variables (alpha or gamma) from any two sets of managers. The test compares the distributions of the values of any two datasets x1 and x2. The null hypothesis of the test is that the distributions are from the same continuous distribution. The alternative hypothesis is that they are from different continuous distributions. The test statistic is given as:

$$\max(\,|\,F1(x) - F2(x)\,|\,) \quad (6)$$

where $F1(x)$ is the proportion of x1 values less than or equal to x and $F1(x)$ is the proportion of x2 values less than or equal to x. This test allows us to come to conclusions about possible differences between the whole distribution of alphas or gammas between any two sets of managers.

4.4. Tests for performance persistence

We also examine whether location has an impact on the performance persistence of any two sets of managers. We examined this issue using the recursive portfolio technique (see Hendricks, Patel, and Zeckhauser (1993)). This technique involves forming equally weighted portfolios of funds based on the sorted fund returns over the previous time period. Each portfolio is then held for a time i.e. a year. The process is repeated recursively each year. More precisely we calculate each fund's alpha over year t. We then rank the funds from highest to smallest alpha. We then form 10 equally weighted portfolios, where portfolio 1 comprises the top 10% of funds with the best risk-adjusted performance (as judged by alpha), portfolio 2 comprises the set of funds that make up the second highest risk-adjusted performance risk (again as judged by alpha), etc. Thus at the end of year t we have formed ten portfolios based upon risk–adjusted performance in year t. We then calculate the monthly returns on these portfolios over year t+1. At the end of t+1 we reform the portfolios based on individual fund risk-adjusted alpha and monitor the performance of these funds over year t+2. By rolling this process on year after year, we end up with a time series of portfolio returns formed on the basis of end of year risk-adjusted performance[2]. We can then estimate the alphas on these decile portfolios. If the alphas for the deciles are significant, we interpret this as evidence of performance persistence. Funds that display persistent, good performance are deemed to be superior to those that do not. We hypothesis again that locally-managed funds are more likely to generate positively persistent fund returns than those managed in a different location, for the same reasons discussed above.

4.5. Returns-based style analysis

Returns based style analysis is a technique that can be used to break down a fund's composition into its most dominant investment styles (Sharpe 1992). It establishes the exposure of a portfolio to variations in returns of major asset classes and thus provides a description of fund performance. To implement this evaluation technique we collected total return data on financial market indices representing twelve different 'asset classes', or styles: t-bills, intermediate-term government bonds, long-term government bonds, corporate bonds, mortgage related securities, large cap value stocks,

[2] To test for the robustness of the recursive portfolio technique we formed portfolios on: alphas calculated over the previous four months; using the t-statistics on the alphas rather than on the alphas themselves; and by forming four rather than ten portfolios each year. In all cases our results were robust to these variants and so are not reported in the results section. However, they are available on request from the authors.

large cap growth stocks, medium cap stocks, small cap stocks, non-US/European bonds, European/US stocks, Japanese stocks.

We undertook returns based style analysis (RBSA) on the funds in our sample. The purpose of this analysis was to establish whether location affected the style of fund returns. We hypothesise that the informational advantage that locals may have, will manifest itself in a greater focus on small cap stocks, since gathering information on these stocks is likely to be more time consuming and difficult for 'foreign' managers. Otten and Bams (2007) expected *'foreigners to invest relatively more in visible, well-known large company stocks, which suffer less from informational disadvantages*.'

5. Results

5.1 Alpha generation and location

5.1.1 Management Location comparison

Table 2 shows estimates of expressions (1) and (2) where the managers have been subdivided so that we can compare the performance of managers, managing the same assets, but in different locations. Panel A presents results based upon the version of the one factor CAPM, while Panel B presents results based upon the Fama and French three factor model. We have used the 95% confidence level to determine the statistical significance, or otherwise of the estimated alphas.

Of the 2,106 managers managing US equities in the US (US/US) the average alpha is estimated to be 0.06% per month; only 6.9% of these funds (145 funds) are estimated to have generated alphas that were significantly positive; while 6.1% of the total fund alphas analyzed (129 funds) are estimated to have produced significantly negative alphas. These results compare favourably to the set of US equity funds managed from Europe (EU/US). Of the 599 European funds analyzed, the mean alpha was estimated to be -0.182%. Only 1.3% of the total fund alphas (7 funds) analyzed are estimated to have generated a significantly positive alpha over this period, but 32.7% of this sample (142) funds) produced significant negative alphas. Values for betas are also given in the table. For both sets of managers they are very close to one and, as one might expect from traditional, long only equity funds are highly statistically significant on average. In the first row of Table 3 we present the results of the statistical test for the differences in these mean alphas and a test of the difference of the distribution of the two sets of alphas generated on different sides of the Atlantic. As can be seen from the table the difference in the means – that is the higher mean alphas produced by US-based fund managers – was found to be statistically significant at the 5% level. The

Kolmogorov-Smirnov test presented in row 1 of the same table support the conclusion that the two alpha distributions are statistically significantly different from one another.

These results are broadly consistent with those of Shukla and van Inwegen (1995) who examined the performance of US and UK funds managing US equities, for the period June 1981 to May 1993. Using the CAPM model and some of its associated performance measures they found that US managers of US equities significantly outperformed UK managers of US equities. Our results are at odds with those of Otten and Bams (2007), who also studied the performance of US equity funds managed in the US and in the UK. Using various factor models to assess performance, they found no evidence of the expected outperformance of US-based managers over UK-based fund managers, in any of the models they used. In fact, they found slight outperformance of UK funds compared to US funds, in the small company segment.

The fourth and fifth columns in Table 2 present a comparison of the management of European equities, either managed from Europe (EU/EU) or from the US. As far as we are aware no similar comparison has been drawn before in the past. These results are extremely interesting. The location hypothesis would suggest that managers based in Europe would be better at managing European equities than managers based in the US. However, our results suggest that our sample of US managers have produced a higher mean alpha than the European managers. The mean alpha of the European managers is estimated to be -0.7%, while it is estimated to be 0.30% for the US managers. 18.5% of US managed European equity funds generated a positive and significant alpha (6 funds) while only 2.7% of European-based managers (38 funds) managed the same feat. At the other end of the scale, 14.8% of US managed European equity funds generated a negative and significant alpha (4 funds) while 17.7% of European-based managers (230 funds) generated a significant, negative alpha. The small sample size of European equity funds managed by US managers (27 in total) makes it difficult to draw definitive conclusions with regard to these results, but this small sample is taken into account by the test for differences in the mean alphas and for differences in the distributions of alphas. These statistics are presented in row 2 of Panel A in Table 3. Both tests indicate that differences are highly significant at conventional confidence levels.

Equivalent results based on the Fama and French three factor model are presented in Panel B of Table 2, and in the last two rows of Panel A in Table 3. On the whole the results do not change any of the basic conclusions with regard to the comparisons. However, as we can see from Table 2, the alphas are on average smaller when the three factor model is used, which is often the case.

Overall, the results presented in Tables 2 and 3 suggest that investors, on average, would have been better off engaging a US fund manager to manage their portfolio of US equities. These results are consistent with the location hypothesis, that is, that local managers may benefit from informational advantages compared to foreign managers of the same set of securities. However, the results with regard to the management of European equities indicate, at least tentatively, that the source of out performance may not be due to the exploitation of local information by local managers, but instead that, on average, US-based managers may be better than managers based in Europe.

5.1.2 Market comparison

To look at the story from a different angle and, as far as we know, in a way that has not been considered before in the literature, the final two columns in Table 2 present results that allow us to make our 'market comparison'. That is, we compare managers managing in the same location, but managing either local or foreign assets. We can begin by comparing managers based in the US either managing US equities (US/US) or managing European equities (US/EU). If the location hypothesis is valid then the former group should on average be able to produce higher alphas than the latter group since they will have readier access to relevant, but local information about their investments. The managers of the European equity funds produced a higher mean alpha of 0.34% compared with a mean alpha of 0.06% generated by the managers of the US equities. A higher proportion of the funds of European equities (18.5% compared with 6.9%) produced positive and significant alphas, although a higher proportion (14.8% compared with 6.1%) produced a significant negative mean alpha for their investors. Once again the small number of European equity funds managed by US managers makes it difficult to draw very definitive conclusions, but the mean difference and distribution difference tests shown in the Table 3 in first row of Panel B, indicates that this difference is significant. We therefore find no support for the location hypothesis with this comparison.

Finally, we can compare the performance of European equity funds managed in Europe (EU/EU), with the performance of US equity funds also managed in Europe (EU/US). The mean alpha produced by both sets of managers is negative: -0.07% for European equity funds managed in Europe, and -0.19% for US equity funds managed in Europe. These results suggest that European-based fund managers are better at managing European equity portfolios than US equity portfolios. The test for the significance of this mean difference and for the difference in the alpha distributions presented in row 2 of panel B in Table 3, suggest that this difference is significant.

Again we also present alpha generation results based on the Fama and French three factor model in Panel B of Table 2, and in the last two rows of panel B in Table 3. Once again, the results with regard to the comparisons are unchanged, but mean alphas are lower.

Overall, this comparison of European-based fund managers presents evidence in support of the location hypothesis, and reinforces the case for Europeans to have their US equity portfolios managed by US-based fund managers. Similarly, it reinforces the case for European fund management companies to establish offices in the US.

5.2 Market Timing and Location

5.2.1 Management location comparison

As well as examining the differences in alpha generation between managers in different locations we also used the Treynor and Mazuy (1966) method to determine whether location has any impact on market timing ability. Given that market timing requires knowledge of local market conditions it would seem reasonable to hypothesise that local managers may have superior market timing skills compared with their non-local counterparts. The results of this analysis are presented in Table 4, in broadly the same format as those presented in Table 2, but with the addition of information about the γ_p term which captures market timing ability. A positive gamma indicates that a manager can time the market, while a negative gamma indicates negative timing ability. As discussed above, we augmented the basic Treynor-Mazuy methodology to encompass the Fama and French three factor model.

Panel A of Table 4 contains the market timing results derived from the one-factor CAPM version of the Treynor-Mazuy methodology, for various subsets of managers. The second column of the table shows that the US managers of US equities (US/US) in our sample generated a mean γ of -0.133 compared with European managers of US equities (EU/US) which was estimated to be a positive 0.362. Taking these observations in isolation then, it seems that managers based in Europe are, on average, better able to time the US equity market than managers based in the US. The test statistic for the difference in means presented in Table 5 indicates that this difference is significant. The test for a difference in gamma distributions of the two sets of managers, also presented in Table 5, also suggests that the γs are generated from different distributions. However, the proportion of managers that produced significant and positive γs is fairly similar in both cases. 6.8% (145) of US-based managers are estimate to have produced a positive and significant γ coefficient, compared

with 5% (30) for the managers based in the US[3]. *Nonetheless, these results present some tentative evidence to suggest that managers based in Europe are better able to time the US market than their US counterparts*.

5.2.2 Market comparison

The last two columns of Table 4 allow us to compare the performance of managers managing in the same location, but managing different securities, that is, allowing us to undertake the '*market comparison*'. First, comparing US managers managing US equities (US/US) with US managers managing European equity portfolios (US/EU). The average gamma of both sets of managers is negative – -0.133 and -0.864 respectively. So, on average, both demonstrate negative market timing abilities, though it appears to be worse in the case of US managers of European equities. Panel B of Table 5 indicates that this difference is significant and the gamma distributions are statistically different from one another too. This evidence does provide some support for the location hypothesis, that is that, US managers of US equity portfolios are better (or at least not as bad) at market timing than US managers of European equity portfolios. However, in both cases the proportion found to have significant, positive market timing skills is very low, 5.0% and 0.0% respectively.

We can also compare the market timing abilities of European managers managing European equity portfolios (EU/EU) with those managing US equity portfolios (EU/US). In the case of both sets of managers the average γ is small and negative, -0.005 and -0.004 respectively. Although the mean difference tests presented in Panel B of Table 5 indicate that this difference is statistically significant, the economic significance of the difference is clearly negligible. To reinforce this point only 1.7% of the sample of managers managing European equities produce a positive and significant γ coefficient while only 0.3% managing US equities manage this feat. Overall then these results are not supportive of the location hypothesis within the European fund management industry; their market timing skills with regard to European and US equity markets are limited and indistinguishable from one another.

Finally, the results of the market timing tests using the Fama and French specification of the Treynor-Mazuy method are largely supportive of the results derived from the CAPM-based version of the test, and are presented in Panel B of Table 4 and in both Panels A and B in Table 5.

[3]. In each case we have used the 95% confidence level to determine significance.

Given that we find evidence for the location hypothesis in the US fund management industry, but not in its European equivalent makes coming to a definitive conclusion about the hypothesis that encompasses the fund management industry on both sides of the Atlantic difficult. Instead our results suggest that the two industries, with regard to this particular skill set at least, are different.

5.3 Persistence and Location

In Table 6 we present the results of the recursive portfolio tests for fund manager persistence, using the procedure described in Section 4 of this paper. Panel A of Table 6 presents strong evidence of positive performance persistence for US managers managing US equity portfolios (US/US). The first four deciles produce positive and statistically significant alphas. There is also evidence of negative persistence too, though this is only statistically significant for the tenth decile. Our results suggest that continually investing in top performing US equity funds managed by managers based in the US will produce positive risk-adjusted performance. However, when we consider the performance of the US equity funds managed by managers based in Europe (EU/US), the picture is very different. Only the top two decile portfolios generate a positive alpha, although neither is statistically significant. The remaining deciles all generate negative alphas that are highly significant for deciles 5 to 10. Panel B of Table 6 show clearly that each US manager decile significantly outperforms the equivalent European manager decile. In other words the best and worst performing US managers outperform their equivalent best and worst performing European counterparts.

Table 6 also presents a comparison of European equities managed in Europe (EU/EU) and managed in the US (US/EU). The small sample of the latter makes it difficult to perform this particular persistence test, but we include the results for completeness. The main point that we can draw out of this is that European mangers of European equities demonstrate no significant tendency for their performance to persist positively, but once again there is ample evidence of negative performance persistence, with the last six performance deciles all producing significant negative alphas.

Finally the results presented Table 6A and B allow us to compare fund managers within the same market, but managing either local or overseas equities. Panel A shows that the recursive technique generally leads to higher mean alphas for US managers of European equities (US/EU) than for US managers of US equities (US/US). But again the small sample for the former probably precludes us from drawing more definitive conclusions with regard to these results. Panel A also allows us to compare European managers of European equities (EU/EU) with European managers of US equities (EU/US). The results suggest that relative, positive performance persistence is more prevalent

when portfolios are formed using US equity funds than European equity funds; this is confirmed by the test statistics presented in Panel B of Table 6. Alphas are generally negative for both sets of recursive portfolios but are less so for those created from portfolios of US equities. This result does not really support the location hypothesis: European managers of US equities produce less negative persistence than European managers of US equities.

5.4 Returns Based Style Analysis and Location

The final methodology we use to examine the impact of location on fund performance is Returns-Based Style Analysis (RBSA). The results reported above indicate that performance does vary according to location, but not necessarily in the direction that the simple location hypothesis might suggest. We use RBSA here to try to identify differences in investment style from one location to another. The location hypothesis implies that local managers would tend to be overweight local, small cap stocks compared to their non-local counterparts.

The RBSA results are presented in Table 7. Following Sharpe, and the subsequent conventional application of RBSA, we use twelve financial market indices that represent different investment styles to analyse the style of US equity returns, but only eleven to examine the European equity fund returns, since the "mortgage-related securities" index which normally forms the base set of indices was not available for European financial markets. Its absence reflects the relatively immature state of the mortgage-related securities market in Europe, compared with that in the US, where such instruments have been traded for a much longer period.

The second and third columns of Table 7 provide strong confirmation of the location hypothesis when we look at the management of US equity portfolios. US managers of US equities (US/US) have an average style exposure of 27.6% to large cap growth stocks, whereas European managers of US equities (EU/US) have a much larger average style exposure of 40.4%. By contrast the US managers of US equities have a much larger average style exposure to small cap stocks of 18.3%, compared with 4.6% for their European manager counterparts. The US managers also have a larger average style exposure to US mid cap stocks of 19.4% compared to an equivalent figure of 10.7% for the European managers. A final point worth nothing in the table is the average style exposure that European managers of US equities have to European equities, which is 14.3%, compared with an average style exposure of 3.8% for US managers of US equities. As the p-values in column 4 of the table show, all of these differences are estimated to be highly statistically significant.

Columns four and five in Table 7 allow us to compare the style preferences of US and European based managers relating to their management of European equities. The main difference in average styles between these two sets of managers relates to large cap growth stocks again. We find that the average exposure of US managers of European equities to large cap European growth stocks is 22.8% compared to an average style exposure of 13.9% for European managers of European equities. Again, the p-value in the final column of the table indicates that this difference is highly, statistically significant. Also, although European managers of European equities have higher average style exposures to mid and small cap European equities, 30.3% and 32.2% respectively, this is not very different from the average US manager exposure, which we estimate to be 28.6% and 26.2% respectively.

Overall then, our RBSA results are largely consistent with the location hypothesis, that is, that local managers of domestic equities manage portfolios with less of a large cap bias than foreign managers of the same equities.

6. Conclusions

Using a dataset comprising the monthly returns on over 4,500 US and European equity funds for the period January 1970 to June 2010, this paper examines whether the location of the fund manager has any influence on the performance of the fund. We refer to this idea as the '*location hypothesis*'. Our results do suggest that management location can be a factor in fund performance. In particular, when investigating the potential impact of location on alpha generation we find that on average, investors would have been better off engaging a US fund manager to manage their portfolio of US equities. These results are consistent with the location hypothesis, that is, that local managers may benefit from informational advantages compared to foreign managers of the same set of securities. However, the results with regard to the management of European equities indicate, at least tentatively that the source of out-performance may not be due to the exploitation of local information by local managers, but instead that, on average, US-based managers are better than managers based in Europe. Similarly, our results reinforce the case for European fund management companies to establish offices in the US. Conversely, the main result from our market timing tests indicates evidence to suggest that managers based in Europe are, surprisingly, better able to time the US market than their US counterparts. The economic and statistical evidence for this result is not overwhelming, but it is possible to envisage managers being outside a market having greater focus on the market's general direction, than those that are perhaps within it.

The results of our RBSA by location is more supportive of the location hypothesis. In particular, we find evidence to suggest that US managers of US equities have a lower average style exposure to large cap growth stocks, than European managers of US equities, but a much larger average style exposure to small cap stocks compared to the exposure of their European manager counterparts. We also find that the average exposure of US managers of European equities to large cap European growth stocks is larger than the average style exposure of their European counterparts. Overall then, our RBSA results are largely consistent with the location hypothesis, that is, that local managers of domestic equities manage portfolios with less of a large cap bias than foreign managers of the same equities

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Table 1: Sources of financial market indices for performance analysis

This table shows the source of the benchmark indices for the performance models used in the paper. Panel A lists the index sources used for the implementation of the CAPM one factor and Fama and French three factor model, used to determine whether location has an impact on alpha generation and on market timing abilities . Panel B lists the indices used to undertake the returns-based style analysis to determine whether location has any impact on investment style.

Panel A: Index sources for CAPM and Fama & French three factor model

Factor	United States	Europe
Risk-free rate	Kenneth French	FT/ICAP
Return on market	Kenneth French	MSCI
Value	Kenneth French	MSCI
Growth	Kenneth French	MSCI
Large Cap	Kenneth French	MSCI
Small Cap	Kenneth French	Thomson Financial

Panel B: Index sources for returns–based style analysis

Factor	United States	Europe
Bills	Kenneth French	FT/ICAP
Intermediate-term Gov Bonds	Barclays Capital	Thomson Financial
Long-term Gov bonds	Barclays Capital	B. of America, Merrill Lynch
Corporate bonds	Barclays Capital	Salomon Brothers CGBI
Mortgage Related Securities	FTSE	N/A
Large Cap Value stocks	Dow Jones Wilshire	MSCI
Large Cap Growth stocks	Dow Jones Wilshire	MSCI
Medium Cap stocks	Dow Jones Wilshire	MSCI
Small Cap stocks	S&P	Thomson Financial
Non-US/EU bonds	Salomon Brothers CGBI	B. of America, Merrill Lynch
European/US stocks	MSCI	MSCI
Japanese stocks	MSCI	MSCI

Table 2: Alpha Generation Analysis for Different Categories

This table reports the average α and β statistics organised by different categories. The figures in parentheses represent average α and β t-values. US/US represents US mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities. Panel A reports the results derived from the one factor CAPM model; while Panel B reports the results generated by the Fama-French three factor model. "α , +ve, sig" represents the proportion of funds that are estimated to have generated a positive and significant α coefficient, and "α , -ve, sig" represents the proportion of funds that are estimated to have generated a negative and significant α coefficient. In each case we have used the 95% confidence level to determine significance. The figures in parentheses following these proportions are the number of funds. The whole sample period is from January 1970 to June 2010 and only funds with at least 36 monthly observations are included.

	Panel A: CAPM Model (expression (1) in text)					
		'Management Location' comparison			**'Market' Comparison**	
	US/US, $	**EU/US, $**	**EU/EU, €**	**US/EU, €**	**US/EU, $**	**EU/US, €**
Mean α_p	0.059 (1.03)	-0.182 (1.62)	-0.070 (1.27)	0.302 (1.28)	0.336 (0.96)	-0.192 (1.01)
Mean β_p	0.999 (26.1)	0.949 (23.4)	0.974 (23.9)	1.085 (29.0)	1.076 (13.9)	0.818 (13.5)
α , +ve, sig	6.9% (145)	1.3% (7)	2.7% (38)	18.5% (6)	18.5% (6)	1.0% (6)
α , -ve, sig	6.1% (129)	32.7% (142)	17.7% (230)	14.8% (4)	14.8% (4)	10.5% (63)
	Panel B: Fama and French Model (expression (2) in text)					
Mean α_p	-0.002 (1.12)	-0.167 (1.59)	-0.122 (1.30)	0.227 (1.04)	0.288 (1.00)	-0.195 (1.04)
Mean β_p	0.981 (27.3)	0.957 (24.4)	0.983 (23.0)	1.137 (28.2)	1.114 (14.7)	0.837 (11.8)
Mean β_s	0.164 (2.9)	0.008 (2.0)	0.272(2.7)	0.646 (3.2)	-0.055 (1.02)	0.018 (0.98)
Mean β_y	0.048 (3.51)	-0.052 (1.90)	0.006 (1.52)	-0.089 (1.98)	0.132 (2.25)	-0.089 (1.14)
α , +ve, sig	5.0% (106)	1.5% (9)	1.1% (14)	18.5% (5)	14.8% (4)	1.3% (8)
α , -ve, sig	11.3% (239)	31.1% (186)	20% (265)	14.8% (4)	14.8% (4)	11.9% (71)

Table 3: Alpha generation tests: Differences in mean alphas and alpha distributions

This table reports test statistics of differences between the mean alphas and differences in the alpha distributions reported in Table 2. The differences in the means of estimated alphas was undertaken using the test described in Freund (2003). The differences in the alpha distributions are tested using the Kolmogorov-Smirmov test. US/US represents U.S. mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities.

		Difference in Mean Alphas		Differences in Alpha Distributions	
Alpha 1	**Alpha 2**	**Mean (α_1) – Mean(α_2)**	**p-value of test H_0 : Mean (α_1) – Mean (α_2) = 0**	**KS Statistic**	**p-value**
		Panel A: Management Location comparison			
CAPM					
US/US	EU/US	0.241	0.002	0.440	0.000
EU/EU	US/EU	-0.381	0.002	0.538	0.000
Fama and French					
US/US	EU/US	0.165	0.002	0.373	0.000
EU/EU	US/EU	-0.349	0.002	0.532	0.000
		Panel B: Market Comparison			
CAPM					
US/US	US/EU	-0.277	0.004	0.269	0.002
EU/EU	EU/US	0.122	0.002	0.485	0.000
Fama and French					
US/US	US/EU	-0.290	0.004	0.515	0.000
EU/EU	EU/US	0.073	0.002	0.444	0.000

Table 4: Market Timing Results

This table reports the average statistics of the regression results for the market timing tests. 'Gamma' in the table represents the marketing timing coefficient. The figures in parentheses represent average α and β t-values. US/US representsUS mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities. Panel A reports the results of the Treynor-Mazuy mode, and Panel B reports the results for the modified Treynor-Mazuy model which incorporates the Fama-French three factor model. "α , +ve, sig" and "γ , +ve, sig" represents the proportion of funds that are estimated to have generated a positive and significant α and γ coefficient respectively; and "α , -ve, sig" and "γ , -ve, sig" represents the proportion of funds that are estimated to have generated a negative and significant α and γ coefficient respectively. In each case we have used the 95% confidence level to determine significance. The figures in parentheses following these proportions are the number of funds. The whole sample period is from January 1970 to June 2010 and only funds with at least 36 monthly observations are included.

Panel A : Treynor and Mazuy (expression (3) in text)

	'Management Location' comparison				'Market' Comparison	
	US/US, $	**EU/US, $**	**EU/EU, €**	**US/EU, €**	**US/EU, $**	**EU/US, €**
Mean α_p	0.051 (1.18)	-0.206 (1.54)	0.062 (1.18)	0.338 (1.37)	0.418 (0.93)	-0.088 (0.87)
Mean β_p	1.00 (26.36)	0.949 (23.66)	0.964 (24.31)	1.083 (27.98)	1.077 (13.97)	0.810 (13.69)
Mean γ_p	-0.133 (1.04)	0.362 (0.88)	-0.005 (1.22)	-0.001 (0.63)	-0.864 (0.52)	-0.004 (0.96)
α , +ve, sig	6.3% (133)	1.5% (9)	8.4% (111)	18.5% (5)	21.4% (6)	1.7% (10)
α , -ve, sig	10.8% (228)	28.4% (170)	9.1% (121)	14.8% (4)	14.8% (4)	3.8% (23)
γ , +ve, sig	6.8% (145)	5.0% (30)	1.7% (23)	0.0%	0.0%	0.3% (2)
γ , -ve, sig	4.9% (104)	2.2% (13)	18.1% (240)	3.7% (1)	3.7% (1)	9.5% (58)

Panel B : Treynor and Mazuy plus FF-3 factor model (expression (4) in text)

α_p	-0.093 (1.07)	-0.193 (1.31)	0.011 (1.07)	0.167 (1.01)	0.443 (0.91)	-0.098 (0.96)
β_p	0.980 (27.26)	0.957 (24.38)	0.964 (21.95)	1.142 (27.65)	1.118 (14.77)	0.826 (11.15)
β_s	0.168 (2.88)	0.010 (1.98)	0.261 (2.75)	0.664 (3.18)	-0.068 (1.01)	0.005 (1.03)
β_y	0.047 (3.52)	-0.052 (1.91)	0.038 (1.60)	-0.082 (2.01)	0.130 (2.26)	-0.078 (1.15)
γ	0.977 (0.97)	0.284 (0.76)	-0.005 (1.22)	0.003 (0.69)	-2.184 (0.55)	-0.004 (0.96)
α , +ve, sig	1.5% (31)	1.0% (5)	3.6% (48)	18.5% (5)	14.8% (4)	3% (18)
α , -ve, sig	12.7% (268)	20.9% (125)	10.1% (134)	14.8% (4)	14.8% (4)	5.5% (33)
γ , +ve, sig	7.9% (167)	3.2% (19)	1.7% (22)	3.7%(1)	0.0%	1.0% (4)
γ , -ve, sig	1.3% (27)	2% (12)	18.8% (249)	0.0%	3.7% (1)	12.3% (75)

Table 5: Market Timing tests: Differences in Mean Gammas and Gamma Distributions

This table reports test statistics of differences between the mean gammas and differences in the gamma distributions reported in Table 5. The differences in the means of estimated gammas was undertaken using the test described in Freund (2003). The differences in the gamma distributions are tested using the Kolmogorov-Smirmov test. US/US represents U.S. mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities.

Panel A: Management Location comparison

		Difference in Mean Gammas		Differences in Gamma Distributions	
Gamma 1	**Gamma 2**	**Mean(γ_1) – Mean(γ_2)**	**p-value of test H_0 : Mean (γ_1) – Mean (γ_2) = 0**	**KS Statistic**	**p-value**
CAPM					
US/US	EU/US	-0.495	0.002	0.364	0.000
EU/EU	US/EU	-0.004	0.002	0.426	0.000
Fama and French					
US/US	EU/US	0.693	0.002	0.261	0.008
EU/EU	US/EU	-0.007	0.043	0.191	0.000

Panel B: Market comparison

		Difference in Mean Gammas		Differences in Gamma Distribution	
Gamma 1	**Gamma 2**	**Mean(γ_1) – Mean(γ_2)**	**p-value of test H_0 : Mean (γ_1) – Mean (γ_2) = 0**	**KS Statistic**	**p-value**
CAPM					
US/US	US/EU	0.731	0.002	0.226	0.002
EU/EU	EU/US	-0.001	0.002	0.582	0.000
Fama and French					
US/US	US/EU	3.161	0.002	0.318	0.009
EU/EU	EU/US	-0.001	0.002	0.366	0.000

Table 6, Panel A: Persistence tests

This table reports the results of the persistence test derived using the recursive portfolio technique. Decile portfolios were formed based alphas estimated over a 12 month formation period. The t-statistics shown are the t-statistics of the resulting alpha sorted, decile portfolios. US/US represents U.S. mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities.

	'Management Location' comparison								**'Market' comparison**			
	US/US, $		**EU/US, $**		**EU/EU, €**		**US/EU, €**		**US/EU, $**		**EU/US, €**	
	Alpha	**T-stat**	**Alpha**	**T-stat**	**Alpha**	**T-stat**	**Alpha**	**T-stat**	**Alpha**	**T-stat**	**Alpha**	**T-stat**
Decile 1	0.313	2.93	0.086	0.705	0.088	0.455	0.459	1.198	0.441	1.012	0.242	1.007
Decile 2	0.205	2.807	0.027	0.275	-0.066	-0.581	0.536	2.353	0.404	1.394	0.101	0.487
Decile 3	0.124	2.26	-0.115	-1.238	-0.073	-0.727	0.158	1.296	0.323	1.607	-0.037	-0.178
Decile 4	0.145	3.208	-0.101	-1.217	-0.108	-1.233	0.074	0.547	0.143	0.733	-0.077	-0.356
Decile 5	0.065	1.678	-0.226	-2.736	-0.189	-2.078	-0.068	-0.78	0.078	0.373	-0.099	-0.451
Decile 6	0.02	0.451	-0.287	-4.075	-0.179	-2.074	0.086	1.008	0.036	0.185	-0.131	-0.596
Decile 7	0.022	0.517	-0.184	-2.201	-0.222	-2.764	-0.025	-0.33	-0.012	-0.064	-0.145	-0.670
Decile 8	-0.033	-0.704	-0.3	-3.529	-0.211	-2.408	0.055	0.473	-0.082	-0.400	-0.223	-1.002
Decile 9	-0.068	-1.058	-0.302	-3.465	-0.249	-2.501	-0.208	-0.77	-0.197	-0.756	-0.175	-0.790
Decile 10	-0.173	-1.912	-0.403	-4.181	-0.324	-2.508	-0.178	-0.53	-0.312	-0.822	-0.230	-1.005

Table 6, Panel B: Persistence tests

This table reports the differences in the alphas of the decile portfolios, reported in Table 6, Panel A, constructed using funds grouped according to location. Decile portfolios were formed based alphas estimated over a 12 month formation period. The t-statistics shown are the t-statistics of the resulting alpha sorted, decile portfolios. The differences in the means of estimated portfolio alphas was undertaken using the test described in Freund (2003). US/US represents U.S. mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities.

	'Management Location' comparison				**'Market' comparison**			
	US/US v EU/US, $		**EU/EU v US/EU, €**		**US/US v US/EU, $**		**EU/EU v EU/US, €**	
	Alpha Diff	**p-value**	**Alpha Diff**	**p-value**	**Alpha Diff**	**p-value**	**Alpha Diff**	**p-value**
Decile 1	0.227	0.002	-0.371	0.002	-0.128	0.002	-0.154	0.002
Decile 2	0.178	0.002	-0.602	0.002	-0.199	0.002	-0.167	0.002
Decile 3	0.239	0.002	-0.231	0.002	-0.199	0.002	-0.036	0.002
Decile 4	0.246	0.002	-0.182	0.002	0.002	0.002	-0.031	0.002
Decile 5	0.291	0.002	-0.121	0.002	-0.013	0.004	-0.09	0.002
Decile 6	0.307	0.002	-0.265	0.002	-0.016	0.002	-0.048	0.545
Decile 7	0.206	0.002	-0.197	0.002	0.034	0.002	-0.077	0.002
Decile 8	0.267	0.002	-0.266	0.002	0.049	0.002	0.012	0.002
Decile 9	0.234	0.002	-0.041	0.914	0.129	0.009	-0.074	0.002
Decile 10	0.230	0.002	-0.146	0.009	0.139	0.002	-0.094	0.007

Table 7: Returns Based Style Analysis

This table reports the average statistics based on the RBSA regression results. Twelve different 'styles' are considered, each represented by a benchmark index. The figures in parentheses represent average α and β t-values. Panel A reports the statistics relating to the average alphas (figures in parentheses represent the average t-ratio on the αs). "α , +ve, sig" represents the proportion of funds that are estimated to have generated a positive and significant α coefficient, and "α , -ve, sig" represents the proportion of funds that are estimated to have generated a negative and significant α coefficient. In each case we have used the 95% confidence level to determine significance. The figures in parentheses following these proportions are the number of funds. Panel B reports the average beta per style factor, which represents the proportion of a fund invested in each asset class. The p-values report a test for the hypothesis that the beta exposures between any two sets of managers are insignificantly different from one another. US/US represents U.S. mutual funds investing in US equities; US/EU represents US mutual funds investing in European equities; EU/EU represents European mutual funds investing in European equities; and EU/US represents European mutual funds investing in US equities.

	US/US, $	**EU/US, $**		**EU/EU, €**	**US/EU, €**	
			Panel A: Alphas			
Mean α_p	-0.179 (1.00)	-0.349 (1.37)		-0.288 (0.89)	0.085 (0.82)	
α , +ve, sig	0.20% (4)	0.10% (4)		0.30% (4)	14.8% (4)	
α , -ve, sig	13.1% (275)	22.2% (133)		6.7% (89)	14.8% (4)	
			Panel B: Average betas (expressed in terms of %)			
			P-value (US/US v EU/US $)			P-Value (EU/EU v US/EU €)
Bills	2.4%	3.1%	0.87	2.9%	0.4%	0.89
Intermediate-term Gov Bonds	0.3%	0.2%	0.97	0.6%	0.2%	0.96
Long-term Gov bonds	0.2%	0.4%	0.89	1.5%	0.0%	0.15
Corporate bonds	1.1%	2.1%	0.47	0.4%	0.1%	0.98
Mortgage Related Securities	1.2%	1.1%	0.49	N/A	N/A	NA
Large Cap Value stocks	24.0%	18.7%	0.002	13.8%	11.1%	0.03
Large Cap Growth stocks	27.6%	40.4%	0.002	13.9%	22.8%	0.002
Medium Cap stocks	19.4%	10.7%	0.002	30.3%	28.6%	0.53
Small Cap stocks	18.3%	4.6%	0.002	32.2%	26.2%	0.14
Non-US bonds	0.5%	1.3%	0.099			
Non- EU bonds				0.9%	1.8%	0.75
European stocks	3.8%	14.3%	0.004			
US stocks				1.6%	5.4%	0.03
Japanese stocks	1.3%	3.0%	0.002	1.9%	3.3%	0.21