Performance of Foreign and Global Mutual Funds: The Role of Security Selection, Region-Shifting, and Style-Shifting Abilities

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Abstract

We examine the performance of U.S.-based foreign and global funds after controlling for their regional and style exposure, including the momentum factor. We show that, on average, the total performance and security selection abilities of both foreign and global funds are significantly negative. Both the funds' abnormal returns and total performance exhibit some short-term predictability. In addition, R^2 can reflect funds' security selection abilities, consistent with previous findings for domestic mutual funds. Investors can earn higher abnormal returns and total performance in the short run by purchasing past winners with low R^2 than by purchasing past losers with high R^2. However, there is no evidence of predictability in the funds' region-shifting and style-shifting abilities.

Keywords: Global and Foreign Funds; Performance Persistence; Region-Shifting Abilities; Style-Shifting Abilities; Security Selection Abilities

JEL Classifications: G11, G15, G20

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The importance of U.S.-based foreign and global funds can be seen from their increasing popularity among investors over the past decade.[1] From 2000 to 2012, U.S.-based world equity fund assets grew from $553 billion to $1,614 billion, with an average annual growth rate of over 9 percent. In 2012, U.S.-based world equity funds accounted for about 12 percent of total U.S. mutual fund assets (see ICI 2013). The popularity of foreign and global funds may be attributed to the diversification benefits that they provide to investors (see, e.g., Detzler and Wiggins, 1997; Eun, et al., 1991; Grubel, 1968; and Levy and Sarnat, 1970). Additionally, some investors believe that international equity markets are less efficient, and thus allow skilled fund managers to earn abnormal returns (see, e.g., Tkac, 2001).

While there are considerable studies on the performance of domestic mutual funds (see, e.g., Amihud and Goyenko, 2013; Brand, et al., 2005; Carhart, 1997; Cremers and Petajisto, 2009; Daniel, et al., 1997; Grinblatt and Titman, 1992; Kacperczyk and Seru, 2007; and Wermers, 2000), research on the performance of foreign and global funds is not as extensive (see, e.g., Cumby and Glen, 1990; Gallo and Swanson, 1996; Glassman and Riddick, 2006; Jiang, et al., 2007; and Turtle and Zhang, 2012). Furthermore, current evidence about the performance of foreign and global equity funds is mixed. For instance, Cumby and Glen (1990) use Jensen's alpha and positive period weighting measure to compare the performance of fifteen U.S.-based internationally diversified mutual funds with that of a broad market index and do not find evidence of positive abnormal returns. Similarly, Breloer, et al. (2014) and Comer and Rodriguez (2014) find negative average abnormal returns earned by foreign and global funds. By contrast, Detzler and Wiggins (1997) find that international mutual funds outperform the inefficient world index. Gallo and Swanson (1996) show superior performance of international mutual funds. Fortin and Michelson (2005) and Fan and Addams (2012) also find some evidence of superior performance of U.S.-based foreign funds.

Current studies on foreign and global fund performance typically use the single global equity index as a benchmark. However, as indicated in Comer and Rodriguez (2014), foreign and global funds

[1] U.S.-based foreign funds are different from global funds in that the latter have much higher exposure to the U.S. market.

have a wide variety of risk exposure across regional markets, and more importantly, their risk exposure can be quite different from that of the global equity index. They find that, contrary to the evidence that funds on average have positive abnormal returns when the global Morgan Stanley Capital International (MSCI) index is used as a benchmark, abnormal returns turn out to be significantly negative after controlling for funds' regional exposure. Additionally, Breloer, et al. (2014) show that although momentum is an important factor, it is often omitted in the performance evaluation of foreign and global funds (see, also, Banegas, et al., 2013). They find that the inclusion of the momentum factor can significantly reduce the abnormal returns of foreign and global funds.

The purpose of this study is to evaluate the performance of foreign and global funds by using a multi-factor model that considers funds' regional and style exposure, including the momentum factor. Additionally, we use the methodology in Herrmann and Scholz (2013) to compute total performance (TP) of funds and then decompose total performance into in-quarter abnormal returns (alpha), region-shifting performance (RSP), and style-shifting performance (SSP).[2] In-quarter abnormal returns measure security selection skills, while region-shifting and style-shifting performances measure region-shifting and style-shifting abilities, respectively. We find that both foreign and global funds have negative total performance and security selection abilities. Also, funds with higher abnormal returns tend to have longer manager's tenure and lower expense and turnover ratios.

Another important aspect of fund performance that interests most investors is performance persistence. If funds can provide superior returns, how persistent can the performance be? While a number of papers study the performance persistence of domestic mutual funds (see, e.g., Brown and Goetzmann, 1995; Goetzmann and Ibbotson, 1994; Hendricks, et al., 1993; and Malkiel, 1995), research on the performance persistence of foreign and global funds is limited. Droms and Walker (2001) find statistically significant persistence in total returns for international mutual funds for one-year holding periods. Considering different performance measures, we find some evidence of short-term predictability in abnormal returns, but no evidence of persistence in region-shifting and style-shifting abilities.

[2] This type of portfolio return decomposition can be traced back to Brinson, et al. (1986) and Brinson, et al. (1991).

Furthermore, a comparison of future performance between past winners and losers shows that investors can earn higher abnormal returns in the short run by purchasing funds with higher abnormal returns in the past quarter. Huij and Derwall (2011) indicate that concentrated global equity funds with a higher level of tracking errors have better performance than broadly diversified portfolios. Similarly, Amihud and Goyenko (2013) indicate that R^2 reflects the security selection ability of mutual funds (see, also, Sun, et al., 2012; and Titman and Tiu, 2011). Therefore, we also sort funds according to their past performance and R^2 and find that investors can earn higher abnormal returns and total performance by purchasing past winners with low R^2 than purchasing past losers with high R^2. However, there is no evidence of predictability in funds' region-shifting and style-shifting abilities, even with the consideration of R^2.

The remainder of the paper is organized as follows. In Section I, we describe the data used in the study. Section II evaluates the performance of foreign and global funds and examines the relationship between fund performance and fund characteristics. In Section III, we evaluate the persistence in fund performance. Section IV conducts robustness checks and Section V concludes the paper.

I. Data and Sample Selection

We consider all U.S.-based global and foreign funds for the period from January 1, 2001 to December 31, 2012 from the survivorship-bias free database of the Center for Research in Security Prices (CRSP). Global and foreign funds are identified by using either their names or Lipper objective and classification codes. To study the performance of diversified global and foreign equity funds, we dismiss international bond funds, balanced funds, and money market funds from our sample.[3] We also exclude funds with predetermined region or industry targets. For instance, funds with words like "Europe", "Pacific", "Developed", "Emerging", "Frontier", "Biotech", and "Telecommunication" are believed to have predetermined region or industry targets and are, therefore, removed from our sample. Funds with the words "Index", "ETF", "fund of funds", "retirement", "target", and "structure" are also dismissed from our list. We require funds in our list to be open to investors. Following Herrmann and Scholz (2013),

[3] These funds are either identified by their names or by their portfolio weights of bonds or cash.

we exclude mutual funds that have less than three quarters of daily returns during the sampling period.[4] These screenings leave us with a final sample of 830 foreign funds and 368 global funds. Table 1 displays descriptive statistics including average life, total net assets, expense ratio, turnover ratio, 12b-1 fees, and annualized fund returns of the final sample. For each fund, data is averaged across years when there is data available from CRSP. The mean, median, and standard deviation across funds are then computed for each group of funds.

The foreign funds have an average life of 9.32 years, similar to the average life of 9.01 years for the global funds. The average total net assets is $233.41 million for the foreign funds, higher than the value of $167.12 million for the global funds. Additionally, there is great variation in the total net assets of mutual funds, with a standard deviation of $972.95 million for the foreign funds and $737.66 million for the global funds, respectively. Both foreign and global funds are similar in their expense ratio and 12b-1 fees. The average expense ratio and 12b-1 fees for foreign (global) funds are 1.59 (1.62) and 0.58 (0.61) percent, respectively. Foreign funds have an average turnover rate of 0.84, similar to the turnover rate of 0.89 for global funds. As for returns, foreign funds have an average annualized return of 3.62 percent, slightly lower than the return of 5.61 percent on global funds. There is also a higher variation of returns among foreign funds; the standard deviation of returns across foreign funds is 17.54 percent, slightly higher than the value of 16.19 percent for the global funds. Overall, we find no significant difference in the life, fund size, fees, expense ratio, turnover ratio, and returns between foreign and global funds in the final sample.

II. Foreign and Global Fund Performance

A. Factor Model

To evaluate the performance of foreign and global funds while controlling for their regional and style exposure, we extend Carhart's (1997) four-factor model by running the following regression:

[4] We assume that there are 21 trading days per month.

$$r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t},$$

where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily returns to the size, book-to-market, and momentum factors, respectively. The coefficient of market index b_i^k measures the exposure of mutual fund *i* to market index *k*, while b_i^{smb}, b_i^{hml}, and b_i^{mom} measure the fund's style exposure. α_i measures the security selection ability of fund *i* after adjusting for risk. Returns are in excess of daily one year Treasury bill returns. If a fund has several share classes outstanding, we consider the equally weighted daily returns of all share classes.

We follow Bollen and Busse (2005), Comer, et al. (2009), and Herrmann and Scholz (2013) by using daily returns in the analysis. Since we are interested in studying the persistence of mutual fund performance over time, using daily returns ensures us to have enough observations. It is not feasible to use monthly or quarterly returns to evaluate performance persistence across years due to the number of factors we consider in our model. In addition, Bollen and Busse (2001) indicate that daily tests are more powerful than monthly tests in measuring the timing ability of mutual funds. For these reasons, we use daily returns in this study.

We consider four regional MSCI indices in the model: North America, Europe, Pacific, and Emerging Market. To construct daily returns to the size factor, we initially compute the differences between the return of small-cap market index and that of large-cap market index for each region and then take their average. Similarly, to construct daily returns to the book-to-market factor, we subtract return of growth market index from that of value market index for each region and then take the average of the regional differences.[5] We use the methodology proposed by Breloer, et al. (2014) to construct the daily

[5] All returns series of large-cap and small-cap regional market indices are available since January 1, 2001. Return series of growth and value market index are available since January 1, 2001 for regions including Europe and Emerging Market. Daily series of regional growth and value market index including North America and Pacific are available since 10/2/2003 and 1/28/2009, respectively.

return to the momentum factor. Specifically, for each quarter we consider 45 MSCI country indices and sort them according to their average daily returns in the past quarter.[6] Then, we construct the daily return to the momentum factor by first computing the average daily return of the country indices that are ranked in the bottom ten in the last quarter and then subtracting that from the average daily return of country indices that are ranked in the top ten.

Due to the integration of world equity markets, the returns of the four regional MSCI indices have become more correlated than before. To address the potential multicollinearity problem, we consider another model that uses a methodology similar to that in Pukthuanthong and Roll (2009). Specifically, for each year from 2001 to 2012, we construct 10 principal components from the daily returns of 17 MSCI country indices, where the weightings are computed from the covariance matrix of daily returns of the same countries in years 1999-2000.[7] Unlike Pukthuanthong and Roll (2009), we do not change the weightings as we move forward because the sensitivity of mutual fund returns to principal components will change as we update the weightings. Maintaining the same weightings also allows us to study mutual funds' region shifting performance over time. We then use the principal components in place of the returns of four regional MSCI indices in the previous model. That is, we consider the following model

$$r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t},$$

where $r_{i,t}$ is the daily excess return of mutual fund i on day t, r_t^p denotes the pth principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily returns to the size, book-to-market, and momentum factors, respectively.

[6] The country indices include MSCI Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, USA, Brazil, Chile, China, Columbia, Czech Republic, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey.

[7] The country indies include MSCI Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, United Kingdom, and United States.

Since the single global market index is frequently used as the benchmark in press and in academic studies for the performance evaluation of foreign and global funds, for comparison, we also compare fund performance with that of the single global market index by running the following regression:

$$r_{i,t} = \alpha_i + b_i^M r_t^M + \omega_{i,t},$$

where $r_{i,t}$ and r_t^M represent daily excess return of fund *i* and the global market index on day *t*, respectively, and b_i^M measures the exposure of fund *i* to the global market index. For foreign funds, we consider the single global index including MSCI World ex-US and MSCI Europe, Australasia, and Far East (EAFE) index as the benchmark. For global funds, since their exposure to the U.S. market is much higher than that of foreign funds, we use single global index of MSCI World and MSCI EAFE as the benchmark.

B. Abnormal Performance

We firstly construct equally weighted portfolios of foreign and global funds and then conduct the regression on portfolio returns for years from 2001 to 2012. The average performance of foreign and global funds are displayed in Tables 2 and 3, respectively. Table 2 Panel A shows the performance of the equally weighted portfolio of foreign funds. When MSCI World ex-US index is used as the benchmark, the results suggest that, on average, foreign funds provide a daily abnormal return of 0.0003 percent. When MSCI EAFE is used as the benchmark, the daily abnormal return is 0.0012 percent. On the contrary, for the model that considers both regional and style exposure, the daily abnormal return decreases to -0.005 percent. Similarly, the model that considers the principal components of returns and style exposure shows a daily abnormal return of -0.0122 percent. In Panel A of Table 3, the results of the equally weighted portfolio of global funds show a similar pattern. The daily abnormal returns are equal to 0.0026 and 0.0019 percents when MSCI World and EAFE indices are used as the benchmark, respectively. The abnormal return reduces to -0.0033 percent in the regional market model and to -0.0072 percent in the principal component model. In sum, compared to the performance when the single global

index is chosen as the benchmark, the abnormal returns of foreign and global funds turn from positive to negative when their regional and style exposure is considered. Additionally, the abnormal return of the principal component model is lower than that of the regional market model.

Since we are interested in the performance of individual funds, we conduct the regression analysis on individual funds. The results of foreign and global funds are displayed in Panel B of Tables 2 and 3, respectively. When individual foreign funds are considered, the average daily abnormal returns are -0.0043 and -0.0038 percents when MSCI World ex-US and EAFE indices are chosen as the benchmark, respectively. The abnormal return decreases to -0.0140 percent in the regional market model and to -0.0211 percent in the principal component model. Additionally, the number of funds with negative abnormal returns increases when the regional and style exposure is considered. For instance, when MSCI World ex-US index is used as the benchmark, 419 of the 830 foreign funds show negative abnormal returns. However, the number of funds with negative abnormal returns increases to 652 funds in the regional market model and to 736 funds in the principal component market model. The results of individual global funds show a similar pattern, as presented in Panel B of Table 3. The average daily abnormal returns are equal to 0.0006 and 0.0014 percents when MSCI World and EAFE indices are used as the benchmark. The abnormal return reduces to -0.0079 percent in the regional market model. Again, the principal component model shows the lowest daily abnormal return of -0.0102 percent. The number of funds with negative abnormal returns also increases in the models that consider both regional and style exposure. Our observation is consistent with the findings in Breloer, et al. (2014) and Comer and Rodriguez (2014) that the abnormal returns of global and foreign funds are significantly reduced when funds' regional exposure or the momentum factor is considered.

Amihud and Goyenko (2013) study domestic equity funds and find that ($1\text{-}R^2$) is positively correlated with Jensen's alpha and is a proxy for the fund's security selection ability. To see if their observation can be extended to foreign and global funds, we rank global and foreign funds according to their *R*-squared and then compare the average alpha of funds with higher *R*-squared with that of funds

with lower *R*-squared.[8] Consistent with the result in Amihud and Goyenko (2013), funds with lower *R*-squared generally show higher abnormal returns than funds with higher *R*-squared. For instance, when MSCI World ex-US (World) index is used as the benchmark, the average daily abnormal return of foreign (global) funds with lower *R*-squared is significantly higher than that of funds with higher *R*-squared by 0.0091 (0.0071) percent. In the multi-factor models, the average abnormal returns of funds with lower *R*-squared is generally higher than that of funds with higher *R*-squared, but the difference narrows and sometimes is not significant. For example, in the regional market model, the abnormal return of foreign funds with lower *R*-squared is higher than that of funds with higher *R*-squared by 0.0041 percent and for global funds, the differences in abnormal returns narrow to 0.0004 percent. In sum, we find evidence that is consistent with previous studies that (1-R^2) reflects the fund's security selection ability.

C. Relation between Fund Attributes and Abnormal Returns

Since the single global index model is frequently used in the performance study of foreign and global funds, it is worthwhile to see if the attributes of funds with superior performance change when the multi-factor model that considers regional and style exposure is used. Thus, we consider a model similar to the one in Amihud and Goyenko (2013) by regressing abnormal returns on mutual fund attributes that may be associated with the fund's performance, including fund's age (*Age*), manager's tenure (*Tenure*), total net assets (*TNA*), expense ratio (*Exp*), turnover ratio (*Turnover*), 12b-1 fees (*Fees*), and transformed R^2 (*TR*):

$$\alpha_i = a_1 + a_2 \log(Age_i) + a_3 \log(Tenure_i) + a_4 \log(TNA_i) + a_5 [\log(TNA_i)]^2 + a_6 Exp_i + a_7 Turnover_i + a_8 Fees_i + a_9 TR_i + \varepsilon_i,$$

[8] We use median as the cutoff point.

where i=1,..,n, α_i represents the daily abnormal return of fund i estimated from the aforementioned models, and $TR = \log\left(\frac{\sqrt{R^2 + 0.5/m}}{1-\sqrt{R^2 + 0.5/m}}\right)$, were m is the sample size.[9] We follow Amihud and Goyenko (2013) by using the transformed R^2 to adjust for the fact that most R^2 is close to one and negatively skewed. Fund's age measures the years between current data date and the date when the fund was first offered. Manager's tenure (years) measures the length of time between the data date and the date when current portfolio manager took control of the fund. Total net assets (in millions) measure the size of the fund. Expense ratio is the proportion of total investment that investors pay for the fund's operating cost, including 12b-1 fees. Turnover ratio is defined as the minimum of aggregated sales or purchases of securities, divided by the average 12-month total net assets of the fund. 12b-1 fees is the ratio of total net assets attributed to marketing and distribution costs. Fund characteristics are determined by the averaged value from the annual data in CRSP over the entire sample period. For comparison, we consider a model that excludes *TR* from the regression. Since expense ratio contains 12b-1 fees and may cause some multicollinearity problems when both factors are included in the regression, we consider another model that excludes 12b-1 fees from the regression.[10] Test statistics are computed using White heteroscedastic-consistent variance estimates. Panels A and B in Table 4 display the results for foreign and global funds, respectively.

For foreign funds, consistent with the finding that (1-R^2) reflects the fund's security selection ability, the coefficient of *TR* is significantly negative. The relationship between abnormal returns and fund characteristics is quite stable under different measures of abnormal returns. Both expense ratio and turnover ratio are negatively related to abnormal returns, suggesting funds that charge higher expense ratios or are actively traded do not offer higher risk adjusted returns to their investors. Funds with longer

[9] See, e.g., Carhart (1997) and Chen, et al. (2004) for more studies on the relationship between fund characteristics and fund performance.

[10] When funds have several share classes, we consider the attributes of the share class with the highest total net assets. We also consider some other alternative models and find that there is no significant change in the results. The conclusion remains valid when only the abnormal return of the share class with the highest total net assets is used as the dependent variable if funds have multiple share classes. The relevant results are available upon request.

manager's tenure also tend to have better performance. Foreign funds' age, total net assets, and 12b-1 fees are positively related to the abnormal returns but the evidence is weak.

The result for global funds is similar to that of foreign funds and is quite consistent under different estimates of abnormal returns. Funds with higher expense and turnover ratios tend to have lower abnormal returns, while the effect of turnover ratio is not statistically significant. Similarly, manager's tenure is positively related to the fund's security selection ability. Like the result for foreign funds, R^2 and abnormal returns are negatively related, but the evidence is not statistically significant for global funds. Additionally, the global funds' total net assets, age, and 12b-1 fees do not have a persistent relationship with funds' security selection ability. In sum, both foreign and global funds with better security selection abilities tend to have longer manager's tenure and lower expense and turnover ratios. R^2 has a negative relationship with the fund's abnormal returns. Furthermore, the relationship between the fund's security selection ability and fund characteristics is quite robust among different measures of abnormal returns.

III. Performance Evaluation and Predictability

A. Performance Decomposition

Another important aspect of fund performance that interests most investors is performance persistence. If funds can provide superior returns, how persistent can the performance be? To evaluate the persistence in returns, for each quarter we perform the following regression:

$$r_{i,t,q} = \alpha_{i,q} + \sum_{k=1}^{N} b_{i,q}^{k} r_{t,q}^{k} + b_{i,q}^{smb} r_{t,q}^{smb} + b_{i,q}^{hml} r_{t,q}^{hml} + b_{i,q}^{mom} r_{t,q}^{mom} + e_{i,t,q},$$

where $r_{i,t,q}$ is the excess return of fund *i* on day *t* in quarter *q*, $r_{t,q}^{k}$ denotes the excess return of regional market index *k* on day *t* in quarter *q*, and $r_{t,q}^{smb}$, $r_{t,q}^{hml}$, and $r_{t,q}^{mom}$ represent the return on day *t* in quarter *q* to the size, book-to-market, and momentum factors, respectively. The coefficient of market index $b_{i,q}^{k}$ measures the exposure of fund *i* to market index *k* in quarter *q*, while $b_{i,q}^{smb}$, $b_{i,q}^{hml}$, and $b_{i,q}^{mom}$ measure fund's

style exposure. $\alpha_{i,q}$ reflects the security selection ability of fund *i* in quarter *q* after adjusting for its regional and style exposure. For comparison, we also consider the model that uses principal components from the daily returns of 17 MSCI country indices in place of the regional market returns.

Following Brinson, et al. (1986), Brinson, et al. (1991), and Herrmann and Scholz (2013), we define total performance (TP) of fund *i* in quarter *q* as

$$\begin{aligned} TP_{i,q} &= \bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q-1}^{k} \bar{r}_{k,q} - b_{i,q-1}^{smb} \bar{r}_{q}^{smb} - b_{i,q-1}^{hml} \bar{r}_{q}^{hml} - b_{i,q-1}^{mom} \bar{r}_{q}^{mom} \\ &= \left(\bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q}^{k} \bar{r}_{k,q} - b_{i,q}^{smb} \bar{r}_{q}^{smb} - b_{i,q}^{hml} \bar{r}_{q}^{hml} - b_{i,q}^{mom} \bar{r}_{q}^{mom} \right) + \sum_{k=1}^{N} \left(b_{i,q}^{k} - b_{i,q-1}^{k} \right) \bar{r}_{k,q} \\ &+ \left[\left(b_{i,q}^{smb} - b_{i,q-1}^{smb} \right) \times \bar{r}_{q}^{smb} + \left(b_{i,q}^{hml} - b_{i,q-1}^{hml} \right) \times \bar{r}_{q}^{hml} + \left(b_{i,q}^{mom} - b_{i,q-1}^{mom} \right) \times \bar{r}_{q}^{mom} \right] \\ &= \alpha_{i,q} + RSP_{i,q} + SSP_{i,q}, \end{aligned}$$

where $\bar{r}_{i,q}$ and $\bar{r}_{k,q}$ denote the average daily returns of fund *i* and market index *k* in quarter *q*, and $\bar{r}_{q}^{smb}$, $\bar{r}_{q}^{hml}$, and $\bar{r}_{q}^{mom}$ represent the average daily return to the size, book-to-market, and momentum factors in quarter *q*, respectively. $\alpha_{i,q}$, the first term on the right hand side of the equation, measures the security selection ability of fund *i* in quarter *q*. The second and third terms measure the region-shifting performance (RSP) and style-shifting performance (SSP) of fund *i* in quarter *q*, respectively. That is, RSP and SSP measure the additional returns that the fund earns by shifting its regional and style exposure in quarter *q*. We also use the principal components instead of the regional market returns to estimate total performance and decompose it into abnormal returns, RSP, and SSP. The results for the regional market and principal component models are displayed in Panels A and B of Table 5, respectively.

In the regional market model, the average total performance of both foreign and global funds are significantly negative. Foreign funds have an average total performance of -0.0089 percent, lower than the value of -0.0035 percent for global funds. Out of the 830 foreign funds, 444 funds have negative total performance, and of the 368 global funds, 204 funds have negative total performance. Performance decomposition shows that, on average, both foreign and global funds have significantly positive region-shifting but significantly negative security selection abilities. Specifically, the average region-shifting

performance is 0.0030 percent for foreign funds and 0.0034 percent for global funds. Consistent with previous results, both foreign and global funds have negative security selection abilities. Foreign funds have an average daily abnormal return of -0.0124 percent, and global funds have an average return of -0.0063 percent. Consistently, there are more funds with negative security selection abilities than with positive security selection skills. Out of the 830 foreign funds, 624 foreign funds have negative alpha across quarters, and 269 of the 368 global funds show negative alpha. The evidence of style shifting abilities is weak for both foreign and global funds. Although the number of funds with positive style-shifting abilities is higher than that with negative performance, the mean style-shifting performance is not significantly different from zero.

The result using the principal component model is reported in Table 5 Panel B. Similarly, both foreign and global funds show negative total performance and security selection abilities. However, in the principal component model, the mean region-shifting performance is statistically negative for both foreign and global funds and there are more funds with negative region-shifting performance than those with positive performance. The measure of funds' region-shifting abilities seems to be sensitive to the way in which region is defined. As for foreign and global funds' style-shifting abilities, again, the evidence is weak.

B. Performance Persistence

Performance persistence is an integral part of fund performance. On the one hand, according to the market efficiency hypothesis, no funds should consistently beat the market on a risk-adjusted basis. On the other hand, investors want to know if funds with better performance in the past will provide better returns in the future. To estimate the persistence of performance, we run funds' performance in quarter q against that in the previous quarter:

$$Perm_{i,q} = a_q + b_q Perm_{i,q-1} + \varepsilon_{i,q},$$

where $Perm_{i,q}$ = alpha, Total performance (TP), Region-shifting performance (RSP), or Style-shifting performance (SSP) for fund *i* in quarter *q*. We conduct cross-sectional regression for each quarter and the slope coefficients are then averaged across quarters. The standard errors are adjusted using White (1980).

The results of regional market and principal component models are reported in Table 6 Panels A and B, respectively. The cross-sectional analysis shows some evidence of positive predictability in abnormal returns and total performance. For the regional market model, regressions based on alpha show that the average slope across quarters are 0.18 and 0.09 for foreign and global funds, respectively. In addition, 72 percent of 48 quarters have positive coefficients for foreign funds and 64 percent of quarters have positive coefficients for global funds. As for total performance, the average slope is 0.10 for foreign funds and 0.12 for global funds. 61 percent of all quarters have positive coefficients for foreign funds and 67 percent of all quarters have positive coefficients for global funds. On the contrary, we do not see significant evidence of predictability in region-shifting performance. For both the foreign and global funds, the percentage of quarters with positive coefficients is similar to that with negative coefficients. There is some evidence of negative predictability in the fund's style-shifting abilities. The principal component model yields similar conclusions. We observe some evidence of positive predictability in funds' total performance and security selection ability. However, the coefficients of region-shifting and style-shifting performance are negative for both foreign and global funds, suggesting better region-shifting or style-shifting performance in the past does not imply better performance in the future.

In this study, we conduct a cross-sectional regression to see if funds that have better performance in the past quarter will on average have better performance in the next period. In a study not reported here (results are available upon request), we run time-series regressions on each fund to see if the fund on average possesses performance persistence over the entire sample period. Our analysis shows that the evidence of predictability in the fund's total performance is mixed. Additionally, the evidence of predictability in the fund's security selection ability is not significant. Along with the findings in cross-sectional analysis, the results suggest that the persistence in fund's performance is at most temporary. Although funds with better total performance and security selection abilities in the past quarter tend to

have higher total performance and abnormal returns in the next quarter, for most funds that persistence does not last throughout the entire sample period. This is also in line with the market efficiency hypothesis that no funds can consistently beat the market on a risk-adjusted basis.

C. Performance Comparison between Winners and Losers

Another way to measure performance persistence is to compare future performance between past winners and losers. To do so, for each quarter q we firstly sort funds using the aforementioned performance measures in that quarter, including alpha, TP, RSP, and SSP, and define funds ranked within the top (bottom) one-third of all funds as winners (losers). Then, we compute and compare the performance measures of funds between the winner and loser groups in quarters q+1, q+4, and q+8, respectively. Huij and Derwall (2011) indicate that concentrated global equity funds with a higher level of tracking errors show better performance than broadly diversified portfolios. Similarly, Amihud and Goyenko (2013) indicate that (1-R^2) can be used as a measure of funds' security selection ability. Thus, we also sort funds according to their performance and R^2 and divide funds into winner/loser and high/low R^2 groups. Specifically, we categorize a fund as a winner (loser) if it is ranked within the top (bottom) one-third among all funds, and define a fund as having high (low) R^2 if its R^2 is above the median R^2 of all funds in quarter q. We then compare future performance of the winner/low R^2 group with that of loser/high R^2 group. The results of regional market and principal component models are reported in Table 7 Panels A and B, respectively.

Consistent with the result in Section III.B, there is some evidence of short-term predictability in security selection abilities and investors can earn higher abnormal returns by purchasing funds with higher alpha in the past quarter. For foreign funds, when sorted by alpha, the abnormal return in quarter q+1 for the winner group is 0.004 percent, which is significantly higher than the abnormal return of -0.018 percent for the loser group. In quarters q+4 and q+8, the differences in the abnormal returns between the winner and loser groups are smaller and insignificant. For global funds, the abnormal return earned by past winners is 0.001 percent in q+1, which is significantly higher than -0.015 percent earned

by past losers. Similar to the results of foreign funds, the differences in the abnormal returns between winners and losers for quarters q+4 and q+8 are smaller and insignificant. As for total performance, while there exists some evidence that past winners earn higher total performance in q+1 than past losers, the result for foreign funds is not significant. For region-shifting and style-shifting abilities, we do not see evidence of predictability. For both foreign and global funds, superior region-shifting and style-shifting abilities in the past are not indicative of better region-shifting and style-shifting performance in the future.

Consistent with Amihud and Goyenko's (2013) conclusion that (1-R^2) is a measure of funds' security selection abilities, adding R^2 as another sorting criterion helps improve the abnormal return and total performance of the winners relative to the losers. For instance, when foreign funds are sorted by alpha and R^2, the winner/low R^2 group has an average abnormal return of 0.003 percent in quarter q+1, which is significantly higher than the average return of -0.014 percent of the loser/high R^2 group. For global funds, the abnormal return of the winner group is 0.024 percent higher than that of the loser group. However, similar to the results when funds are sorted by alpha only, for both foreign and global funds, there is no significant difference in the abnormal return between the winner/low R^2 and loser/high R^2 groups in quarters q+4 and q+8.

When both foreign and global funds are sorted by total performance and R^2, the winner/low R^2 group has somewhat higher total performance than the loser/high R^2 group in quarter q+1. For instance, for foreign funds, the total performance of the winner/low R^2 group is 0.013 percent, which is significantly higher than the -0.013 percent of the loser/high R^2 group. This is different from the insignificant result when foreign funds are sorted by total performance only, suggesting that adding R^2 as another sorting criterion helps improve the performance of the winners relative to the losers. For region-shifting and style-shifting performance, again, there is no significant difference in the future region-shifting and style-shifting performance between the winner and loser groups, even with the consideration of R^2. Table 7 Panel B shows the result when the principal component model is used. Similar to previous findings, there exists some evidence of short-term predictability in funds' security selection abilities. The evidence of predictability in total performance is only short-term and very weak. Adding R^2 as another

criterion helps improve the security selection abilities and total performance of winners relative to those of losers. However, no evidence of predictability in the regional-shifting and style-shifting abilities can be found.

IV. Robustness Check

A. Subsample Period

In the study we consider the sample period from January 1, 2001 to December 31, 2012. To see if the finings still hold in subsample periods, we divide the sample period into two: 1/1/ 2001-12/31/2006, and 1/1/2007-12/31/2012. For each subsample period, we compare the abnormal returns generated by the aforementioned models and present the results in Appendix Tables A and B for foreign and global funds, respectively. Similar to the finding when the entire sample period is used, the abnormal returns of foreign and global funds decrease in the multi-factor models that consider the regional and style exposure. Again, the number of funds with negative abnormal returns increases in the regional market or principal component models. Most foreign and global funds do not possess superior security selection abilities after the consideration of their regional and style exposure. During the subsample period of 2001-2006, funds with lower *R*-squared show higher abnormal returns than those with higher *R*-squared. However, the relationship between *R*-squared and abnormal returns is not clear during the period of 2007-2012. This may be attributed to the financial crisis occurring during that period.

B. The Largest Share Class

For funds with several share classes, we use the equally weighted returns cross classes in the regressions. In the literature, some studies (see, e.g., Gasper, et al., 2006) only keep returns from the share class with the highest net asset value. For a robustness check, we conduct the analysis by using returns from the share class with the highest total net assets if funds have multiple share classes. Appendix Table C presents the abnormal returns under the aforementioned regression models, Table D displays the decomposition of total performance into abnormal returns, region-shifting and style-shifting performance,

and Table E compares the future performance between winners and losers. The abnormal returns of funds decrease and are negative in the regional and principal component models. Performance decomposition shows that both foreign and global funds have negative total performance and abnormal returns. Also, investors can earn higher abnormal returns in the next quarter by purchasing funds with higher abnormal returns in the past quarter. Adding R^2 as another ranking criterion helps improve the total performance and abnormal returns of past winner relative to the past losers in the next quarter. Our main conclusions remain valid when the returns from the largest share class are used.

C. Monthly and Quarterly Returns

In this study, we use daily returns to ensure that there is sufficient data to examine performance persistence. However, some studies on mutual fund performance use either monthly or quarterly returns. To check if our conclusion is robust when lower frequency data is used, we rerun the regressions using monthly and quarterly returns. Appendix Tables F and G present the monthly and quarterly abnormal returns estimated by the aforementioned models, respectively. In the regional market model, the average monthly abnormal return for the foreign (global) funds is -0.19 (-0.13) percent. When quarterly returns are used, the average quarterly abnormal return for the foreign (global) funds is -0.32 (-0.18) percent. Again, the estimated abnormal returns are higher when the single global market index is used as the benchmark.

V. Conclusions

We study the performance of U.S.-based foreign and global mutual funds, while controlling their various regional and style exposure, including the momentum factor. We show that the abnormal returns of foreign and global funds decrease after the consideration of funds' regional and style exposure, and their security selection abilities and total performance are significantly negative. Funds with better security selection abilities are associated with lower R^2, longer manager's tenure, and lower expense and turnover ratios. Furthermore, there exists some evidence of short-term predictability in the abnormal

returns and total performance of foreign and global funds. Investors can earn higher abnormal returns and total performance by purchasing past winners with low R^2 than by purchasing past losers with high R^2. Thus, we show that previous findings that ($1-R^2$) is a proxy of domestic equity funds' security selection abilities can also be applied to foreign and global funds. However, there is no evidence of predictability in funds' region-shifting and style-shifting performance; superior region-shifting and style-shifting abilities in the past are not indicative of better region-shifting and style-shifting performance in the future, even with the consideration of R^2. We focus on the performance of U.S.-based foreign and global funds. It would be interesting to exam the performance of worldwide foreign and global funds and see if similar conclusions can be made, which deserves attention from future research.

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Table 1 Sample Descriptive Statistics

This table displays the summary statistics of the final sample for the period from January 1, 2001 to December 31, 2012. The sample contains 830 foreign funds and 368 global funds. Data for average life, total net assets, expense ratio, turnover ratio, 12b-1 fees, and annualized fund returns are averaged across years for each fund. The mean, median, and standard deviation across funds are then computed for each group of funds.

	Average life (years)	Total net assets (in millions)	Expense ratio (%)	Turnover ratio	12b-1 fees (%)	Annualized fund returns (%)
Foreign funds						
Mean	9.32	233.41	1.59	0.84	0.58	3.62
Median	7.94	18.86	1.50	0.76	0.50	7.04
Standard deviation	6.25	972.95	0.58	0.57	0.34	17.54
Global funds						
Mean	9.01	167.12	1.62	0.89	0.61	5.61
Median	7.06	11.99	1.52	0.67	0.50	7.50
Standard deviation	6.31	737.66	0.63	1.07	0.35	16.19

Table 2 Foreign Fund Abnormal Returns

This table presents daily abnormal return α (in percent) of 830 foreign funds based on regressions of daily returns for the period from January 1, 2001 to December 31, 2012. If the fund has several share classes, we consider the equally weighted daily returns of all share classes. The first two columns show the results of single global market index models that use MSCI World ex-US index and MSCI EAFE index as the benchmark, respectively. The third column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. The last column shows the result of the model that considers the principal components of country returns and style exposure: $r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t}$, where r_t^p denotes the *p*th principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns. Panel A displays the results based on the equally weight portfolio of foreign funds, and the results of individual foreign funds are presented in Panel B. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared in Panel B. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	World ex-US	EAFE	Regional market and style change model	Principal component and style change model
Panel A: Equally weighted mutual fund portfolio				
α	0.0003	0.0012	-0.0050	-0.0122
R-squared	0.67	0.63	0.86	0.84
Panel B: Individual mutual funds				
α				
Average	-0.0043	-0.0038	-0.0140	-0.0211
Median	-0.0002	0.0007	-0.0088	-0.0149
95% percentile	0.0244	0.0250	0.0117	0.0066
5% percentile	-0.0492	-0.0497	-0.0586	-0.0736
Positive	411	434	178	94
Negative	419	396	652	736
Significantly positive	21	21	11	6
Significantly negative	82	79	144	215
Correlation(α, *R*-squared)	-0.13	-0.17	0.07	0.06
Average α of funds with low *R*-squared	0.0002	0.0009	-0.0120	-0.0192
Average α of funds with high *R*-squared	-0.0089	-0.0086	-0.0161	-0.0230
Differences in α	0.0091***	0.0095***	0.0041**	0.0037*

Table 3 Global Fund Abnormal Returns

This table presents daily abnormal return α (in percent) of 368 global funds based on regressions of daily returns for the period from January 1, 2001 to December 31, 2012. If the fund has several share classes, we consider the equally weighted daily returns of all share classes. The first two columns show the results of single global market index models that use MSCI World index and MSCI EAFE index as the benchmark, respectively. The third column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. The last column shows the result of the model that considers the principal components of country returns and style exposure: $r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t}$, where r_t^p denotes the *p*th principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns. Panel A displays the results based on the equally weight portfolio of global funds, and the results of individual global funds are presented in Panel B. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared in Panel B. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	World	EAFE	Regional market and style change model	Principal component and style change model
Panel A: Equally weighted mutual fund portfolio				
α	0.0026	0.0019	-0.0033	-0.0072
R-squared	0.91	0.50	0.95	0.88
Panel B: Individual mutual funds				
α				
Average	0.0006	0.0014	-0.0079	-0.0102
Median	0.0010	0.0044	-0.0056	-0.0079
95% percentile	0.0279	0.0346	0.0198	0.0196
5% percentile	-0.0371	-0.0517	-0.0488	-0.0520
Positive	195	231	116	92
Negative	173	137	252	276
Significantly positive	22	8	13	6
Significantly negative	26	12	68	54
Correlation(α, *R*-squared)	-0.32	0.06	-0.18	-0.13
Average α of funds with low *R*-squared	0.0041	0.0017	-0.0077	-0.0108
Average α of funds with high *R*-squared	-0.0030	0.0010	-0.0080	-0.0096
Differences in α	0.0071***	0.0008	0.0004	-0.0013

Table 4 Relations between Fund Attributes and Abnormal Returns

This table shows the results of regressing abnormal returns on various fund attributes, including the fund's age (*Age*), manager's tenure (*Tenure*), total net assets (*TNA*), expense ratio (*Exp*), turnover ratio (*Turnover*), 12b-1 fees (*Fees*), and transformed R^2 (*TR*). The abnormal returns are estimated from the single global index models that are based on MSCI World index (World ex-US for foreign funds) and MSCI EAFE index, respectively, and the multi-factor models that consider regional and style exposure. Test statistics are computed using White heteroscedastic-consistent variance estimates. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The result of foreign and global funds are displayed in Panels A and B, respectively.

Panel A: Foreign funds

	World ex-US		EAFE		Regional market and style change model		Principal component and style change model	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	0.000058	0.60	0.000058	0.62	0.000105	0.77	0.000229	1.68*
Log(*Age*)	0.000016	0.19	0.000024	0.29	0.000032	0.49	-0.000031	-0.43
Log(*Tenure*)	0.000231	2.84***	0.000231	2.75***	0.000219	3.30***	0.000240	3.26***
Log(*TNA*)	0.000001	0.11	0.000000	-0.04	0.000005	0.42	0.000006	0.47
Log(*TNA*)^2	0.000001	0.83	0.000002	0.92	0.000001	0.71	0.000001	0.87
Exp	-0.006879	-1.37	-0.006749	-1.31	-0.010240	-2.29**	-0.011164	-2.50**
Turnover	-0.000127	-3.22***	-0.000130	-3.18***	-0.000159	-3.60***	-0.000171	-3.87***
Fees	0.006051	0.85	0.006232	0.85	0.009972	1.55	0.010761	1.64
TR	-0.000183	-1.81*	-0.000195	-1.96*	-0.000179	-1.88*	-0.000367	-3.33***
Adjusted *R*-square	0.27		0.27		0.33		0.33	
Prob(F-statistic)	0.00		0.00		0.00		0.00	
Constant	-0.000057	-0.88	-0.000055	-0.83	-0.000127	-2.12**	-0.000180	-2.62***
Log(*Age*)	0.000004	0.05	0.000011	0.12	0.000063	0.91	0.000011	0.15
Log(*Tenure*)	0.000268	3.63***	0.000273	3.56***	0.000228	3.35***	0.000266	3.40***
Log(*TNA*)	0.000006	0.49	0.000005	0.39	0.000004	0.38	0.000006	0.44
Log(*TNA*)^2	0.000001	0.59	0.000001	0.68	0.000001	0.72	0.000002	0.81
Exp	-0.009915	-2.05**	-0.010135	-2.06**	-0.009816	-1.88*	-0.012160	-2.13**
Turnover	-0.000111	-2.55**	-0.000114	-2.55**	-0.000141	-2.80***	-0.000139	-2.65***
Fees	0.009317	1.33	0.009870	1.38	0.010301	1.42	0.012781	1.62
Adjusted *R*-square	0.24		0.24		0.31		0.29	
Prob(F-statistic)	0.00		0.00		0.00		0.00	
Constant	-0.000096	-1.22	-0.000097	-1.22	-0.000186	-2.48**	-0.000252	-3.02***
Log(*Age*)	-0.000162	-2.49**	-0.000158	-2.39**	-0.000062	-1.02	-0.000113	-1.70*
Log(*Tenure*)	0.000283	4.06***	0.000288	4.09***	0.000243	3.81***	0.000274	3.76***
Log(*TNA*)	0.000022	1.95*	0.000022	1.91*	0.000016	1.51	0.000019	1.53
Log(*TNA*)^2	0.000001	0.33	0.000001	0.34	0.000001	0.53	0.000001	0.58
Exp	-0.003364	-1.04	-0.003395	-1.04	-0.004281	-1.42	-0.004949	-1.46
Turnover	-0.000072	-2.49**	-0.000073	-2.51**	-0.000085	-2.76***	-0.000092	-2.76***
Adjusted *R*-square	0.11		0.11		0.13		0.13	
Prob(F-statistic)	0.00		0.00		0.00		0.00	

Panel B: Global funds

	World		EAFE		Regional market and style change model		Principal component and style change model	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	0.000334	2.78***	0.000074	0.56	0.000068	0.52	0.000035	0.25
Log(*Age*)	-0.000071	-0.92	-0.000088	-0.81	-0.000109	-1.42	-0.000142	-1.87*
Log(*Tenure*)	0.000109	1.41	0.000243	2.10**	0.000160	2.01**	0.000178	2.34**
Log(*TNA*)	-0.000022	-1.33	-0.000007	-0.27	-0.000011	-0.57	-0.000010	-0.56
$\text{Log}(TNA)^2$	0.000004	2.03**	0.000001	0.44	0.000003	1.65	0.000003	1.73*
Exp	-0.011324	-4.21***	-0.019083	-3.66***	-0.010115	-3.29***	-0.009448	-3.27***
Turnover	-0.000015	-1.80*	0.000005	0.43	-0.000014	-1.33	-0.000012	-1.19
Fees	0.010016	2.11**	0.007369	0.84	0.008814	1.66*	0.006262	1.17
TR	-0.000203	-2.45**	0.000258	1.15	-0.000061	-0.95	-0.000057	-0.55
Adjusted *R*-square	0.20		0.15		0.16		0.16	
Prob(F-statistic)	0.00		0.00		0.00		0.00	
Constant	0.000088	1.32	0.000200	1.80*	-0.000025	-0.35	-0.000032	-0.46
Log(*Age*)	-0.000102	-1.45	-0.000073	-0.60	-0.000109	-1.46	-0.000142	-1.90*
Log(*Tenure*)	0.000162	2.15**	0.000212	1.96*	0.000172	2.20**	0.000186	2.50**
Log(*TNA*)	-0.000020	-1.06	-0.000012	-0.44	-0.000011	-0.56	-0.000010	-0.57
$\text{Log}(TNA)^2$	0.000004	1.98**	0.000001	0.50	0.000004	1.70*	0.000004	1.77*
Exp	-0.010173	-4.21***	-0.019930	-3.36***	-0.009442	-3.25***	-0.009236	-3.26***
Turnover	-0.000004	-0.58	-0.000003	-0.30	-0.000011	-1.10	-0.000010	-1.07
Fees	0.007617	1.69*	0.008391	0.95	0.008084	1.57	0.005997	1.14
Adjusted *R*-square	0.14		0.14		0.16		0.16	
Prob(F-statistic)	0.00		0.00		0.00		0.00	
Constant	0.000072	1.72*	0.000206	3.18***	-0.000008	-0.21	-0.000020	-0.49
Log(*Age*)	-0.000096	-2.07**	-0.000162	-2.18**	-0.000107	-2.27**	-0.000142	-2.90
Log(*Tenure*)	0.000107	2.08**	0.000128	1.87*	0.000113	2.23**	0.000117	2.33
Log(*TNA*)	-0.000005	-0.37	0.000005	0.29	0.000001	0.11	0.000005	0.38
$\text{Log}(TNA)^2$	0.000003	1.85*	0.000001	0.66	0.000003	1.78*	0.000002	1.63
Exp	-0.005995	-3.14***	-0.012398	-3.09***	-0.006523	-3.64***	-0.006406	-3.38
Turnover	-0.000024	-1.47	-0.000037	-1.31	-0.000029	-1.72*	-0.000029	-1.77
Adjusted *R*-square	0.15		0.19		0.20		0.21	
Prob(F-statistic)	0.00		0.00		0.00		0.00	

Table 5 Decomposition of Foreign and Global Fund Performance

This table displays the decomposition of mutual fund performance. Total performance ($TP_{i,q}$) of fund *i* in quarter *q* is decomposed into in-quarter abnormal returns $\alpha_{i,q}$, region-shifting performance ($RSP_{i,q}$), and style-shifting performance ($SSP_{i,q}$) by the following equation:

$$
\begin{aligned}
TP_{i,q} &= \bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q-1}^{k} \bar{r}_{k,q} - b_{i,q-1}^{smb} \bar{r}_{q}^{smb} - b_{i,q-1}^{hml} \bar{r}_{q}^{hml} - b_{i,q-1}^{mom} \bar{r}_{q}^{mom} \\
&= \left(\bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q}^{k} \bar{r}_{k,q} - b_{i,q}^{smb} \bar{r}_{q}^{smb} - b_{i,q}^{hml} \bar{r}_{q}^{hml} - b_{i,q}^{mom} \bar{r}_{q}^{mom} \right) + \sum_{k=1}^{N} \left(b_{i,q}^{k} - b_{i,q-1}^{k} \right) \bar{r}_{k,q} \\
&+ \left[\left(b_{i,q}^{smb} - b_{i,q-1}^{smb} \right) \times \bar{r}_{q}^{smb} + \left(b_{i,q}^{hml} - b_{i,q-1}^{hml} \right) \times \bar{r}_{q}^{hml} + \left(b_{i,q}^{mom} - b_{i,q-1}^{mom} \right) \times \bar{r}_{q}^{mom} \right] \\
&= \alpha_{i,q} + RSP_{i,q} + SSP_{i,q},
\end{aligned}
$$

where $\bar{r}_{i,q}$ and $\bar{r}_{k,q}$ denote the average daily returns of fund *i* and market index *k* in quarter *q*, and $\bar{r}_{q}^{smb}$, $\bar{r}_{q}^{hml}$, and $\bar{r}_{q}^{mom}$ represent the average daily return to the size, book-to-market, and momentum factor in quarter *q*, respectively. The coefficient of market index $b_{i,q}^{k}$ measures the exposure of fund *i* to market index *k* in quarter *q*, while $b_{i,q}^{smb}$, $b_{i,q}^{hml}$, and $b_{i,q}^{mom}$ measure the fund's style exposure in quarter *q*. $\alpha_{i,q}$, the first term on the right hand side of the equation, measures the daily abnormal return of fund *i* in quarter *q*. The second and third terms respectively denote the region-shifting performance (RSP) and style-shifting performance (SSP) of fund *i* in quarter *q*. The estimated return is averaged across quarters for each fund. Mean and median report the mean and median value of various performance measures of all funds. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Positive (Negative) shows the number of funds with positive (negative) performance measures and significantly positive (negative) shows the number of funds whose performance is significantly positive (negative). The results of regional market and principal component models are reported in Panels A and B, respectively.

Panel A: Regional market and style change model

	Total performance	Alpha	Region-shifting performance	Style-shifting performance
		Foreign funds		
Mean (%)	-0.0089***	-0.0124***	0.0030***	0.0005
Median (%)	-0.0020	-0.0090	0.0030	0.0028
Positive	386	206	549	516
Negative	444	624	281	314
Significantly positive	1	2	44	2
Significantly negative	64	67	6	6
		Global funds		
Mean (%)	-0.0035**	-0.0063***	0.0034***	-0.0006
Median (%)	-0.0030	-0.0087	0.0028	0.0011
Positive	164	99	243	207
Negative	204	269	125	161
Significantly positive	6	4	24	1
Significantly negative	22	43	2	4

Panel B: Principal component and style change model

	Total performance	Alpha	Region-shifting performance	Style-shifting performance
		Foreign funds		
Mean (%)	-0.0310***	-0.0272***	-0.0083***	0.0005
Median (%)	-0.0248	-0.0282	-0.0058	0.0031
Positive	113	43	225	505
Negative	717	787	605	325
Significantly positive	0	0	4	1
Significantly negative	133	173	33	1
		Global funds		
Mean (%)	-0.0169***	-0.0123***	-0.0123***	0.0039**
Median (%)	-0.0189	-0.0157	-0.0107	0.0019
Positive	89	64	65	214
Negative	279	304	303	154
Significantly positive	3	1	2	1
Significantly negative	49	15	35	3

Table 6 Analysis of Performance Persistence

This table shows the results of the following regression that estimates the persistence of various mutual fund performance measures: $Perm_{i,q} = a_i + b_q Perm_{i,q-1} + \varepsilon_{i,q}$, where $Perm_{i,q}$ = alpha, Total performance (TP), Region-shifting performance (RSP), and Style-shifting performance (SSP) for fund *i* in quarter *q*. Cross-sectional regressions for each quarter are conducted and the standard errors are adjusted using White (1980). Average slope displays the averaged slope across quarters for various performance measures. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Positive (Negative) reports the percentage of quarters with positive (negative) slope and significantly positive (negative) shows the percentage of quarters whose slope is significantly positive (negative). The results of regional market and principal component models are reported in Panels A and B, respectively.

Panel A: Regional market and style change model

	Alpha	TP	RSP	SSP
Foreign funds				
Average slope	0.18***	0.10	0.02	-0.12
Positive (% of all quarters)	0.72	0.61	0.48	0.37
Negative (% of all quarters)	0.28	0.39	0.52	0.63
Significantly positive with p=0.05 (% of all quarters)	0.49	0.33	0.20	0.24
Significantly negative with p=0.05 (% of all quarters)	0.09	0.15	0.26	0.35
Global funds				
Average slope	0.09	0.12	0.12	-0.17
Positive (% of all quarters)	0.64	0.67	0.54	0.39
Negative (% of all quarters)	0.36	0.33	0.46	0.61
Significantly positive with p=0.05 (% of all quarters)	0.43	0.41	0.30	0.22
Significantly negative with p=0.05 (% of all quarters)	0.15	0.28	0.30	0.37

Panel B: Principal component and style change model

	Alpha	TP	RSP	SSP
Foreign funds				
Average slope	0.13*	0.00	-0.07	0.02
Positive (% of all quarters)	0.62	0.63	0.48	0.39
Negative (% of all quarters)	0.38	0.37	0.52	0.61
Significantly positive with p=0.05 (% of all quarters)	0.34	0.39	0.20	0.22
Significantly negative with p=0.05 (% of all quarters)	0.13	0.15	0.33	0.46
Global funds				
Average slope	0.10	0.09	-0.19	-0.02
Positive (% of all quarters)	0.60	0.61	0.37	0.35
Negative (% of all quarters)	0.40	0.39	0.63	0.65
Significantly positive with p=0.05 (% of all quarters)	0.43	0.39	0.24	0.24
Significantly negative with p=0.05 (% of all quarters)	0.15	0.24	0.37	0.35

Table 7 Future Performance Comparison between Winners and Losers

This table shows and compares the performance (in percent) of the winner and loser groups in quarters q+1, q+4, and q+8, where the winners/losers are identified by sorting various performance measures in quarter q. The performance measures considered include in-quarter abnormal returns (α), total performance (TP), region-shifting performance (RSP), and style-shifting performance (SSP). In addition, funds are sorted by respective performance measures and R^2 and the results displayed in the last four columns compare the performance (in percent) between the winner/low R^2 and loser/high R^2 groups. Paired t test is conducted between the winner and loser groups and ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The results of regional market and principal component models are reported in Panels A and B, respectively.

Panel A: Regional market and style change model

	Sorted by α	Sorted by TP	Sorted by RSP	Sorted by SSP	Sorted by α & R^2	Sorted by TP & R^2	Sorted by RSP & R^2	Sorted by SSP & R^2
				Foreign funds				
q+1								
Winners	0.004	0.009	0.002	-0.002	0.003	0.013	0.002	-0.001
Losers	-0.018	0.002	0.002	0.004	-0.014	-0.013	0.003	-0.001
Winners-Losers	0.022***	0.007	0.001	-0.006	0.017***	0.026*	0.000	0.000
q+4								
Winners	-0.006	-0.001	0.004	-0.002	-0.006	-0.001	0.004	-0.002
Losers	-0.013	0.023	0.003	0.010	-0.013	0.004	0.004	0.008
Winners-Losers	0.007	-0.025	0.001	-0.012	0.007	-0.005	0.000	-0.009
q+8								
Winners	-0.008	0.006	0.005	0.006	-0.009	0.005	0.006	0.004
Losers	-0.006	0.005	0.004	0.008	-0.008	0.005	0.004	0.007
Winners-Losers	-0.002	0.002	0.001	-0.003	-0.001	0.000	0.002	-0.003
				Global funds				
q+1								
Winners	0.001	0.006	0.002	-0.005	0.006	0.012	0.002	-0.007
Losers	-0.015	-0.017	0.002	0.004	-0.018	-0.019	0.002	0.002
Winners-Losers	0.016***	0.023*	0.001	-0.008	0.024***	0.030	0.000	-0.009
q+4								
Winners	-0.002	-0.005	0.002	0.002	0.004	-0.007	0.002	0.001
Losers	-0.009	-0.001	0.002	0.000	-0.010	-0.004	0.002	0.005
Winners-Losers	0.007	-0.004	-0.001	0.003	0.013*	-0.004	0.000	-0.004
q+8								
Winners	-0.007	0.002	0.003	0.000	-0.005	0.005	0.005	0.005
Losers	-0.003	-0.007	0.000	0.001	-0.003	-0.008	0.002	-0.001
Winners-Losers	-0.004	0.009	0.004*	-0.001	-0.001	0.014	0.003	0.005

Panel B: Principal component and style change model

	Sorted by α	Sorted by TP	Sorted by RSP	Sorted by SSP	Sorted by α & R^2	Sorted by TP & R^2	Sorted by RSP & R^2	Sorted by SSP & R^2
				Foreign funds				
q+1								
Winners	-0.010	-0.016	-0.006	0.003	-0.022	-0.011	-0.004	0.005
Losers	-0.034	-0.018	-0.006	-0.008	-0.033	-0.038	-0.005	-0.021
Winners-Losers	0.023*	0.002	0.000	0.011	0.011*	0.028***	0.001	0.026
q+4								
Winners	-0.019	-0.023	-0.001	0.002	-0.022	-0.024	-0.001	-0.003
Losers	-0.032	-0.001	-0.002	0.010	-0.035	-0.023	-0.003	0.006
Winners-Losers	0.013*	-0.022	0.001	-0.008	0.013***	-0.001	0.001	-0.009
q+8								
Winners	-0.027	-0.015	0.001	-0.013	-0.027	-0.010	0.000	0.010
Losers	-0.030	-0.020	0.002	0.008	-0.027	-0.021	0.002	0.002
Winners-Losers	0.002	0.006	-0.001	-0.021	0.000	0.011	-0.002	0.008
				Global funds				
q+1								
Winners	-0.010	-0.013	-0.015	-0.001	-0.009	-0.012	-0.016	0.004
Losers	-0.019	-0.029	-0.004	0.005	-0.026	-0.038	0.005	-0.002
Winners-Losers	0.009	0.016	-0.011	-0.006	0.017**	0.026**	-0.021	0.006
q+4								
Winners	-0.009	-0.013	0.000	0.005	-0.005	-0.023	-0.008	-0.001
Losers	-0.021	-0.022	-0.013	0.001	-0.025	-0.021	-0.014	0.002
Winners-Losers	0.012	0.009	0.013*	0.004	0.020	-0.002	0.006	-0.003
q+8								
Winners	-0.010	-0.010	-0.009	0.005	-0.008	0.001	-0.013	0.013
Losers	-0.021	-0.027	-0.002	0.001	-0.018	-0.030	-0.008	-0.001
Winners-Losers	0.011	0.017	-0.007	0.004	0.010	0.031**	-0.005	0.013

Appendix

Table A Foreign Fund Abnormal Returns based on Subsample Period

This table presents daily abnormal return α (in percent) of 830 foreign funds based on regressions of daily returns for subsample periods from January 1, 2001 to December 31, 2006 (Panel A), and from January 1, 2007 to December 31, 2012 (Panel B), respectively. If the fund has several share classes, we consider the equally weighted daily returns of all share classes. The first two columns show the results of single global market index models that use MSCI World ex-US index and MSCI EAFE index as the benchmark, respectively. The third column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. The last column shows the result of the model that considers the principal components of country returns and style exposure: $r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t}$, where r_t^p denotes the *p*th principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: (2001-2006)

	World ex-US	EAFE	Regional market and style change model	Principal component and style change model
Equally weighted mutual fund portfolio				
α	-0.0004	0.0003	-0.0130	-0.0240
R-squared	0.87	0.86	0.91	0.90
Individual mutual funds				
α				
Average	-0.0037	-0.0032	-0.0164	-0.0282
Median	-0.0013	-0.0005	-0.0125	-0.0227
95% percentile	0.0400	0.0408	0.0168	0.0064
5% percentile	-0.0519	-0.0527	-0.0616	-0.0817
Positive	288	295	145	55
Negative	316	309	459	549
Significantly positive	75	76	13	7
Significantly negative	105	100	211	341
Correlation(α, *R*-squared)	-0.13	-0.13	0.05	0.07
Average α of funds with low *R*-squared	0.0033	0.0036	-0.0155	-0.0267
Average α of funds with high *R*-squared	-0.0107	-0.0101	-0.0173	-0.0298
Differences in α	0.0140***	0.0137***	0.0018	0.0031

Panel B: (2007-2012)

	World ex-US	EAFE	Regional market and style change model	Principal component and style change model
Equally weighted mutual fund portfolio				
α	0.0006	0.0016	-0.0093	-0.0155
R-squared	0.60	0.56	0.92	0.87
Individual mutual funds				
α				
Average	-0.0001	0.0008	-0.0104	-0.0164
Median	0.0011	0.0020	-0.0099	-0.0153
95% percentile	0.0233	0.0247	0.0113	0.0046
5% percentile	-0.0300	-0.0303	-0.0332	-0.0433
Positive	375	385	117	56
Negative	302	292	560	621
Significantly positive	7	7	6	3
Significantly negative	3	3	44	45
Correlation(α, *R*-squared)	0.16	0.12	0.13	0.22
Average α of funds with low *R*-squared	-0.0022	-0.0012	-0.0090	-0.0181
Average α of funds with high *R*-squared	0.0020	0.0028	-0.0118	-0.0147
Differences in α	-0.0042***	-0.0040**	0.0028**	-0.0033**

Table B Global Fund Abnormal Returns based on Subsample Period

This table presents daily abnormal return α (in percent) of 368 global funds based on regressions of daily returns for subsample periods from January 1, 2001 to December 31, 2006 (Panel A), and from January 1, 2007 to December 31, 2012 (Panel B), respectively. If the fund has several share classes, we consider the equally weighted daily returns of all share classes. The first two columns show the results of single global market index models that use MSCI World index and MSCI EAFE index as the benchmark, respectively. The third column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. The last column shows the result of the model that considers the principal components of country returns and style exposure: $r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t}$, where r_t^p denotes the *p*th principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: (2001-2006)

	World	EAFE	Regional Market and Style Change Model	Principal Component and Style Change Model
Equally weighted mutual fund portfolio				
α	0.0020	-0.0039	-0.0121	-0.0140
R-squared	0.94	0.60	0.96	0.90
Individual mutual funds				
α				
Average	-0.0008	-0.0053	-0.0135	-0.0150
Median	-0.0001	-0.0015	-0.0109	-0.0139
95% percentile	0.0381	0.0389	0.0196	0.0164
5% percentile	-0.0456	-0.0658	-0.0597	-0.0645
Positive	114	106	53	44
Negative	114	122	175	184
Significantly positive	29	18	8	4
Significantly negative	36	19	86	82
Correlation(α, *R*-squared)	-0.40	-0.13	-0.24	-0.29
Average α of funds with low *R*-squared	0.0075	-0.0011	-0.0110	-0.0119
Average α of funds with high *R*-squared	-0.0090	-0.0095	-0.0160	-0.0181
Differences in α	0.0165***	0.0084**	0.0050*	0.0061**

Panel B: (2007-2012)

	World	EAFE	Regional market and style change model	Principal component and style change model
Equally weighted mutual fund portfolio				
α	0.0039	0.0079	-0.0035	-0.0079
R-squared	0.90	0.46	0.97	0.90
Individual mutual funds				
α				
Average	0.0045	0.0082	-0.0046	-0.0074
Median	0.0025	0.0086	-0.0057	-0.0082
95% percentile	0.0282	0.0366	0.0200	0.0165
5% percentile	-0.0211	-0.0236	-0.0304	-0.0319
Positive	194	233	108	81
Negative	125	86	211	238
Significantly positive	5	3	5	1
Significantly negative	2	0	25	9
Correlation(α, *R*-squared)	-0.30	0.17	-0.18	-0.21
Average α of funds with low *R*-squared	0.0082	0.0053	-0.0038	-0.0075
Average α of funds with high *R*-squared	0.0009	0.0111	-0.0055	-0.0071
Differences in α	0.0073***	-0.0058***	0.0017	-0.0004

Table C Abnormal Returns based on the Largest Share Class

This table presents daily abnormal return α (in percent) from regressions of daily returns for the period from January 1, 2001 to December 31, 2012. If a fund has several share classes, we consider only the returns from the share class with the highest total net assets. The results for foreign and global funds are presented in Panels A and B, respectively. The first two columns show the results of single global market index models. The third column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the daily excess return of fund *i* on day *t*, r_t^k denotes the daily excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the daily return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices, including North America, Europe, Pacific, and Emerging Market. The last column shows the result of the model that considers the principal components of country returns and style exposure: $r_{i,t} = \alpha_i + \sum_{p=1}^{10} b_i^p r_t^p + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + \varepsilon_{i,t}$, where r_t^p denotes the *p*th principal component from the daily returns of 17 MSCI country indices in excess of Treasury bill returns. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Foreign funds

	World ex-US	EAFE	Regional market and style change model	Principal component and style change model
Equally weighted mutual fund portfolio				
α	0.0004	0.0013	-0.0050	-0.0122
R-squared	0.66	0.63	0.86	0.84
Individual mutual funds				
α				
Average	-0.0043	-0.0039	-0.0144	-0.0215
Median	0.0002	0.0011	-0.0087	-0.0149
95% percentile	0.0246	0.0251	0.0116	0.0063
5% percentile	-0.0498	-0.0501	-0.0595	-0.0748
Positive	426	451	180	99
Negative	404	379	650	731
Significantly positive	21	22	13	6
Significantly negative	82	81	149	202
Correlation(α, *R*-squared)	-0.10	-0.13	0.13	0.13
Average α of funds with low *R*-squared	-0.0001	0.0007	-0.0133	-0.0202
Average α of funds with high *R*-squared	-0.0086	-0.0084	-0.0155	-0.0228
Differences in α	0.0085***	0.0091***	0.0022	0.0025

Panel B: Global funds

	World	EAFE	Regional market and style change model	Principal component and style change model
Equally weighted mutual fund portfolio				
α	0.0025	0.0019	-0.0033	-0.0072
R-squared	0.91	0.50	0.95	0.88
Individual mutual funds				
α				
Average	0.0013	0.0017	-0.0082	-0.0105
Median	0.0006	0.0053	-0.0060	-0.0081
95% percentile	0.0278	0.0356	0.0178	0.0174
5% percentile	-0.0393	-0.0531	-0.0490	-0.0485
Positive	194	228	115	88
Negative	174	140	253	280
Significantly positive	22	8	12	7
Significantly negative	25	13	68	50
Correlation(α, *R*-squared)	-0.41	0.07	-0.15	-0.05
Average α of funds with low *R*-squared	0.0060	0.0018	-0.0077	-0.0109
Average α of funds with high *R*-squared	-0.0035	0.0017	-0.0086	-0.0101
Differences in α	0.0096***	0.0000	0.0009	-0.0008

Table D Decomposition of Foreign and Global Fund Performance based on the Largest Share Class

This table displays the decomposition of mutual fund performance. If a fund has several share classes, we consider only the returns from the share class with the highest total net assets. Total performance ($TP_{i,q}$) of fund *i* in quarter *q* is decomposed into in-quarter abnormal returns $\alpha_{i,q}$, region-shifting performance ($RSP_{i,q}$), and style-shifting performance ($SSP_{i,q}$) by the following equation:

$$
\begin{aligned}
TP_{i,q} &= \bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q-1}^{k}\bar{r}_{k,q} - b_{i,q-1}^{smb}\bar{r}_{q}^{smb} - b_{i,q-1}^{hml}\bar{r}_{q}^{hml} - b_{i,q-1}^{mom}\bar{r}_{q}^{mom} \\
&= \left(\bar{r}_{i,q} - \sum_{k=1}^{N} b_{i,q}^{k}\bar{r}_{k,q} - b_{i,q}^{smb}\bar{r}_{q}^{smb} - b_{i,q}^{hml}\bar{r}_{q}^{hml} - b_{i,q}^{mom}\bar{r}_{q}^{mom} \right) + \sum_{k=1}^{N}\left(b_{i,q}^{k} - b_{i,q-1}^{k}\right)\bar{r}_{k,q} \\
&+ \left[\left(b_{i,q}^{smb} - b_{i,q-1}^{smb}\right)\times\bar{r}_{q}^{smb} + \left(b_{i,q}^{hml} - b_{i,q-1}^{hml}\right)\times\bar{r}_{q}^{hml} + \left(b_{i,q}^{mom} - b_{i,q-1}^{mom}\right)\times\bar{r}_{q}^{mom}\right] \\
&= \alpha_{i,q} + RSP_{i,q} + SSP_{i,q},
\end{aligned}
$$

where $\bar{r}_{i,q}$ and $\bar{r}_{k,q}$ denote the average daily returns of fund *i* and market index *k* in quarter *q*, and $\bar{r}_{q}^{smb}$, $\bar{r}_{q}^{hml}$, and $\bar{r}_{q}^{mom}$ represent the average daily return to the size, book-to-market, and momentum factor in quarter *q*, respectively. The coefficient of market index $b_{i,q}^{k}$ measures the exposure of fund *i* to market index *k* in quarter *q*, while $b_{i,q}^{smb}$, $b_{i,q}^{hml}$, and $b_{i,q}^{mom}$ measure fund's style exposure in quarter *q*. $\alpha_{i,q}$, the first term on the right hand side of the equation, measures the daily abnormal return of fund *i* in quarter *q*. The second and third terms respectively denote the region-shifting performance (RSP) and style-shifting performance (SSP) of fund *i* in quarter *q*. The estimated return is averaged across quarters for each fund. Mean and median report the mean and median value of various performance measures of all funds. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Positive (Negative) shows the number of funds with positive (negative) performance measures and significantly positive (negative) shows the number of funds whose performance is significantly positive (negative). The results of regional market and principal component models are reported in Panels A and B, respectively.

Panel A: Regional market and style change model

	Total performance	Alpha	Region-shifting performance	Style-shifting performance
		Foreign funds		
Mean (%)	-0.0084***	-0.0117***	0.0017	0.0016
Median (%)	-0.0007	-0.0079	0.0031	0.0024
Positive	406	261	551	498
Negative	424	569	279	332
Significantly positive	3	2	41	4
Significantly negative	48	47	5	6
		Global funds		
Mean (%)	-0.0030*	-0.0051**	0.0022*	-0.0001
Median (%)	-0.0006	-0.0074	0.0027	0.0012
Positive	179	111	244	208
Negative	189	257	124	160
Significantly positive	12	5	24	2
Significantly negative	17	36	0	3

Panel B: Principal component and style change model

	Total performance	Alpha	Region-shifting performance	Style-shifting performance
		Foreign funds		
Mean (%)	-0.0303***	-0.0283***	-0.0104***	0.0017
Median (%)	-0.0225	-0.0263	-0.0056	0.0025
Positive	147	52	234	485
Negative	683	778	596	345
Significantly positive	0	1	1	3
Significantly negative	100	113	33	1
		Global funds		
Mean (%)	-0.0084	-0.0097***	-0.0133***	0.0086***
Median (%)	-0.0161	-0.0127	-0.0101	0.0017
Positive	100	72	75	215
Negative	268	296	293	153
Significantly positive	3	1	1	2
Significantly negative	31	12	30	4

Table E Performance Comparison between Winners and Losers based on the Largest Share Class

This table shows and compares the performance (in percent) of the winner and loser groups in quarters q+1, q+4, and q+8, where the winners/losers are identified by sorting various performance measures in quarter q. The performance measures considered include in-quarter abnormal returns (α), total performance (TP), region-shifting performance (RSP), and style-shifting performance (SSP). In addition, funds are sorted by respective performance measures and R^2 and the results displayed in the last four columns compare the performance (in percent) between the winner/low R^2 and loser/high R^2 groups. If a fund has several share classes, we consider only the returns from the share class with the highest total net assets. Paired t test is conducted between the winner and loser groups and ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The results of regional market and principal component models are reported in Panels A and B, respectively.

Panel A: Regional market and style change model

	Sorted by α	Sorted by TP	Sorted by RSP	Sorted by SSP	Sorted by α & R^2	Sorted by TP & R^2	Sorted by RSP & R^2	Sorted by SSP & R^2
				Foreign funds				
q+1								
Winners	0.006	0.012	0.002	-0.001	0.006	0.016	0.001	0.000
Losers	-0.016	-0.017	0.002	0.003	-0.014	-0.013	0.003	-0.002
Winners-Losers	0.023***	0.029*	0.001	-0.005	0.020***	0.029**	-0.001	0.002
q+4								
Winners	-0.005	0.001	0.004	0.000	-0.003	0.000	0.004	-0.003
Losers	-0.011	0.002	0.004	0.009	-0.011	0.006	0.004	0.006
Winners-Losers	0.007	-0.001	0.000	-0.009	0.008	-0.007	0.000	-0.009
q+8								
Winners	-0.007	0.007	0.005	0.006	-0.008	0.007	0.006	0.004
Losers	-0.003	0.005	0.005	0.008	-0.005	0.006	0.005	0.007
Winners-Losers	-0.004	0.002	0.001	-0.002	-0.003	0.001	0.001	-0.003
				Global funds				
q+1								
Winners	0.005	0.007	0.002	-0.004	0.011	0.014	0.002	-0.006
Losers	-0.017	-0.015	0.001	0.004	-0.015	-0.017	0.001	0.003
Winners-Losers	0.022***	0.022*	0.001	-0.008	0.026***	0.031**	0.001	-0.009
q+4								
Winners	0.000	-0.005	0.002	0.005	0.004	-0.005	0.002	0.004
Losers	-0.007	0.001	0.001	0.000	-0.008	0.002	0.002	0.006
Winners-Losers	0.007	-0.006	0.001	0.004	0.012*	-0.008	0.000	-0.002
q+8								
Winners	-0.006	0.003	0.004	0.002	-0.003	0.006	0.005	0.005
Losers	-0.003	-0.008	0.001	-0.001	-0.002	-0.008	0.001	0.000
Winners-Losers	-0.004	0.011	0.003*	0.003	-0.001	0.015	0.003	0.005

Panel B: Principal component and style change model

	Sorted by α	Sorted by TP	Sorted by RSP	Sorted by SSP	Sorted by α & R^2	Sorted by TP & R^2	Sorted by RSP & R^2	Sorted by SSP & R^2
				Foreign funds				
q+1								
Winners	-0.008	-0.016	-0.006	0.001	-0.019	-0.011	-0.005	0.003
Losers	-0.032	-0.036	-0.006	-0.011	-0.029	-0.035	-0.004	-0.024
Winners-Losers	0.024	0.020**	-0.001	0.012	0.010*	0.024**	-0.001	0.028
q+4								
Winners	-0.026	-0.022	0.000	0.001	-0.022	-0.025	-0.002	-0.006
Losers	-0.029	-0.023	-0.002	0.010	-0.032	-0.023	-0.001	0.009
Winners-Losers	0.003	0.000	0.002	-0.009	0.010***	-0.003	-0.001	-0.015
q+8								
Winners	-0.025	-0.014	0.000	-0.016	-0.025	-0.010	0.001	0.008
Losers	-0.027	-0.019	0.000	0.009	-0.026	-0.019	0.000	0.003
Winners-Losers	0.001	0.005	0.001	-0.025	0.001	0.009	0.000	0.005
				Global funds				
q+1								
Winners	-0.009	-0.012	-0.014	-0.004	-0.007	-0.010	-0.015	0.000
Losers	-0.020	-0.025	-0.003	0.009	-0.016	-0.035	0.003	-0.001
Winners-Losers	0.010	0.012	-0.011	-0.012	0.010	0.025*	-0.018	0.001
q+4								
Winners	-0.014	-0.012	0.002	0.003	-0.010	-0.024	-0.007	-0.002
Losers	-0.019	-0.020	-0.013	0.002	-0.021	-0.019	-0.014	0.007
Winners-Losers	0.005	0.009	0.014	0.001	0.011	-0.005	0.008	-0.009
q+8								
Winners	-0.012	-0.012	-0.007	-0.001	-0.010	-0.003	-0.006	0.006
Losers	-0.015	-0.023	-0.005	0.001	-0.013	-0.023	-0.005	0.000
Winners-Losers	0.004	0.010	-0.002	-0.001	0.003	0.020	-0.001	0.006

Table F Abnormal Returns of Mutual Funds based on Monthly Returns

This table presents monthly abnormal return α (in percent) from regressions of monthly returns for the period from January 1, 2001 to December 31, 2012. If a fund has several share classes, we consider the equally weighted monthly returns of all share classes. The results for foreign and global funds are presented in Panels A and B, respectively. The first two columns show the results of single global market index models. The last column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the monthly excess return of fund *i* on month *t*, r_t^k denotes the monthly excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the monthly return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Foreign funds

	World ex-US	EAFE	Regional market and style change model
Equally weighted mutual fund portfolio			
α	-0.12	-0.10	-0.17
R-squared	0.97	0.97	0.98
Individual mutual funds			
α			
Average	-0.06	-0.04	-0.19
Median	-0.04	-0.02	-0.15
95% percentile	0.40	0.41	0.21
5% percentile	-0.63	-0.60	-0.74
Positive	340	370	164
Negative	450	420	626
Significantly positive	71	76	19
Significantly negative	157	139	232
Correlation(α, *R*-squared)	-0.06	-0.07	0.01
Average α of funds with low *R*-squared	-0.04	-0.02	-0.22
Average α of funds with high *R*-squared	-0.08	-0.06	-0.17
Differences in α	0.03*	0.04**	-0.05**

Panel B: Global funds

	World	EAFE	Regional market and style change model
Equally weighted mutual fund portfolio			
α	-0.06	-0.09	-0.14
R-squared	0.96	0.92	0.97
Individual mutual funds			
α			
Average	0.01	0.05	-0.13
Median	0.01	0.05	-0.13
95% percentile	0.52	0.56	0.34
5% percentile	-0.54	-0.58	-0.71
Positive	182	199	115
Negative	166	149	233
Significantly positive	52	55	28
Significantly negative	38	32	95
Correlation(α, *R*-squared)	-0.08	0.13	-0.01
Average α of funds with low *R*-squared	0.03	0.01	-0.16
Average α of funds with high *R*-squared	-0.01	0.09	-0.1
Differences in α	0.04	-0.08**	-0.06**

Table G Abnormal Returns of Mutual Funds based on Quarterly Returns

This table presents quarterly abnormal return α (in percent) from regressions of quarterly returns for the period from January 1, 2001 to December 31, 2012. If a fund has several share classes, we consider the equally weighted quarterly returns of all share classes. The results for foreign and global funds are presented in Panels A and B, respectively. The first two columns show the results of single global market index models. The last column displays the result of the model that considers regional and style exposure: $r_{i,t} = \alpha_i + \sum_{k=1}^{N} b_i^k r_t^k + b_i^{smb} r_t^{smb} + b_i^{hml} r_t^{hml} + b_i^{mom} r_t^{mom} + e_{i,t}$, where $r_{i,t}$ is the quarterly excess return of fund *i* on quarter *t*, r_t^k denotes the quarterly excess return of regional market index *k*, and r_t^{smb}, r_t^{hml}, and r_t^{mom} represent the quarterly return to the size, book-to-market, and momentum factors, respectively. Here we consider four regional MSCI market indices: North America, Europe, Pacific, and Emerging Market. Positive (negative) shows the number of funds that have positive (negative) abnormal returns and significantly positive (negative) reports the number of funds with significantly positive (negative) abnormal returns. Correlation(α, *R*-squared) represents the correlation between abnormal returns and *R*-squared. Funds are sorted according to their *R*-squared and the average α of funds with higher and lower levels of *R*-squared are displayed and compared. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Foreign funds

	World ex-US	EAFE	Regional market and style change model
Equally weighted mutual fund portfolio			
α	-0.33	-0.28	-0.36
R-squared	0.98	0.98	0.98
Individual mutual funds			
α			
Average	-0.03	0.04	-0.32
Median	-0.06	0.01	-0.29
95% percentile	1.18	1.25	0.66
5% percentile	-1.27	-1.20	-1.44
Positive	285	312	176
Negative	335	308	444
Significantly positive	69	76	16
Significantly negative	114	97	128
Correlation(α, *R*-squared)	-0.15	-0.14	-0.02
Average α of funds with low *R*-squared	0.03	0.12	-0.29
Average α of funds with high *R*-squared	-0.09	-0.04	-0.34
Differences in α	0.12**	0.17***	0.05

Panel B: Global funds

	World index	EAFE	Regional market and style change model
Equally weighted mutual fund portfolio			
α	-0.17	-0.24	-0.27
R-squared	0.96	0.92	0.97
Individual mutual funds			
α			
Average	0.21	0.20	-0.18
Median	0.13	0.11	-0.22
95% percentile	1.49	1.62	1.14
5% percentile	-0.92	-1.26	-1.39
Positive	152	141	95
Negative	103	114	160
Significantly positive	40	46	19
Significantly negative	20	19	37
Correlation(α, *R*-squared)	-0.11	0.09	-0.13
Average α of funds with low *R*-squared	0.27	0.07	-0.16
Average α of funds with high *R*-squared	0.14	0.32	-0.19
Differences in α	0.13	-0.24*	0.02**