Can Active International Funds Exploit Profit Opportunities in Different Markets?

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Abstract

In this paper, we study how active international mutual funds change their country allocations over time. We examine the hypothesis that active international mutual funds are skilled in exploiting time-varying profit opportunities in different countries through moving their investment allocations. Consistent with the hypothesis, we find a positive relation between a fund's country rotation and its subsequent performance both in the cross section and in the time series. This country rotation-performance relation is stronger among smaller funds which incur less trading costs, among high-expense funds which signal high skills, and among funds with high turnover which trade more. A fund's quarterly change of holding in a country is also positively associated with the future benchmark-adjusted returns in the country holdings. Funds gain more from moving their assets to countries with higher profit opportunities as proxied by higher cross-border equity inflows and higher volatility. Mutual fund investors seem to recognize high country rotation funds with larger flows. Our evidence suggests that international mutual funds have skills in changing their country allocations and in market timing.

Keywords: Country asset allocation; International investments; Mutual funds

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1. Introduction

The benefits of international diversification have been proposed in the finance literature since the 1970s.[1] In the decades since, with the lowering of investment barriers in different countries, investors have diversified their investments around the world. International equity mutual funds are the primary investment vehicles for domestic investors to invest overseas. The total assets under management of U.S. international equity funds have reached a staggering $3.2 trillion in 2020. Approximately 80% of these international equity fund assets are actively managed, as compared to 66% of domestic equity fund assets (Investment Company Fact Book 2021). Country allocations of international mutual funds are highlighted on fund web pages, fund literature, fund family investment outlooks, and SEC filings.[2] These funds help channel investors' assets into equity investments in different countries, where profit opportunities can vary widely over time.[3] At any point, deciding upon how to move investments from country to country is an important question active international funds need to confront.

In principle, international funds can generate superior performance from exploiting the time-varying investment opportunities in different markets. In practice, however, moving assets across countries involves various costs including transaction expenses, illiquidity, information asymmetry, and market segmentation (Brennan and Cao 1997, Bekaert and Harvey 1995, Bekaert, Harvey, and Lundblad 2007, Sercu and Vanpee 2008, Amihud et al. 2015). Despite the importance of the topic, little academic evidence exists on whether international funds actively change their country allocations to exploit opportunities in different markets. In this paper, we aim to fill in this gap and study the country rotation of active U.S. international mutual funds.

We define country rotation as the extent to which a fund changes its country allocation between two quarters. The higher a fund's country rotation is, the more assets a fund shifts across countries between two quarters. We seek to understand how much active international funds

[1] Solnik (1974), Adler and Dumas (1983), French and Poterba (1991), De Santis and Gerard (1997), Stulz (1999), Errunza, Hogan, and Hung (1999), Dahlquist and Harvey (2001), Karolyi and Stulz (2003), Chan, Covrig, and Ng (2005), Driessen and Laeven (2007), and Bailey, Kumar and Ng (2008), among others.

[2] Most active international equity funds showcase their country allocation on fund web pages and literature. Many funds report equity holdings by country weights to their investors and in SEC filings. Fund families also regularly publish their investment outlooks for different countries. In the appendix, we include examples of active U.S. international equity funds marketing their country allocation. Morgan Stanley active international allocation fund states that it relies on a "proprietary, top-down framework to quantitatively and qualitatively rank developed and emerging countries, where allocation decisions are based on a country's projected future economic growth and equity market return potential." The fund also displays its country allocation on the webpages. The SEC Edgar filings of the fund show that the fund groups its equity holdings by country and report the percentage of total net assets in each country. We also show the examples of investment outlooks in different countries and regions published by T. Rowe Price.

[3] Each country is different in growth prospect and macroeconomic conditions, in capital market environment like transparency, size and depth, and also in language, culture, legal and political systems.

change their country portfolio weights from quarter to quarter, and whether the funds pursuing country rotations are skilled in exploiting profit opportunities in different countries.

Our study is most related to, and builds upon, Pastor, Stambaugh, and Taylor (2017) who develop a model on funds exploiting time-varying profit opportunities through trading. Under their model, funds generate returns net of costs by trading more when they perceive great profit opportunities (e.g., purchasing underpriced securities before a subsequent correction of mispricing). Consistent with the model's key implication, they document a positive time-series relation between turnover and fund performance for U.S. domestic equity mutual funds. International mutual funds have a much larger potential pool of stocks to choose from around the world. Theoretical literature on global tactical asset allocation derives optimal allocation under different conditions (Dahlquist and Harvey 2001, Ang and Bekaert 2004, Das and Uppal 2004).[4] With asynchronous market cycles, different countries' stock markets present a wider range of profit opportunities at different times (Bekaert and Harvey 1995, Ang and Bekaert 2004, Baker, Wurgler and Yu 2012). At the same time, international stock markets also present higher costs than U.S. domestic market due to illiquidity, information asymmetry, and transaction expense. Our paper focuses on the country rotation of active international funds, which are tasked to consider and exploit profit opportunities in different countries at different times. The quarterly country holding changes enable us to evaluate funds' abilities to exploit international profit opportunities.

If certain international funds are skilled in identifying and exploiting profit opportunities in different markets, then they would move their assets from countries with fewer profit opportunities to countries with more profit opportunities at the right time. In periods when funds perceive greater profit opportunities in different markets, they would move their country allocations more. This implies a positive cross-sectional and time-series relation between country rotation and subsequent fund performance. Meanwhile, funds with greater abilities to perceive profit opportunities in different countries and incurring lower costs in trading on such opportunities would move their country allocations more and generate better performance.

Consistent with our predictions, we find that funds with high country rotation have superior performance in the times series and in the cross section. For the same fund, a one-standard-

[4] Dahlquist and Harvey (2001) study global tactical asset allocation with conditional information. Ang and Bekaert (2004) investigate international asset allocation under regime switching. Das and Uppal (2004) investigate how jump risks affect optimal international asset allocation.

deviation increase in its country rotation leads to an increase in annualized fund benchmark adjusted returns of 0.5%. This increase is economically meaningful in that it is equivalent to a 26% increase relative to the average annualized fund benchmark adjusted return. Cross-sectionally, for a fund with a one standard deviation increase in country rotation, its annualized fund benchmark adjusted returns would be 0.27% higher.

Looking across funds, we find smaller, high-expense, and high-turnover funds particularly benefit from high country rotations. The evidence is consistent with funds exploiting profit opportunities in different countries. Smaller funds are able to trade less liquid stocks because they usually trade in smaller trading amounts, and they incur lower costs in their trades when they buy and sell in different countries. The larger pool of potential investments and lower costs contribute to superior returns from country rotation in these small funds.

Funds with high expense have stronger country rotation-performance relations. It is typical to assume that skilled funds would charge higher expenses and fees than less-skilled funds.[5] Managers with lower skills are less likely to correctly identify profit opportunities, and hence their country rotations would be less related to future performance. Thus, our finding suggests that skilled funds are more able to exploit profit opportunities in different markets than less-skilled funds.

Funds trade to take advantage of profit opportunities in different markets, hence the country rotation-performance relation should be stronger among high-turnover funds. We find that a fund's country rotation is more associated with future returns if the fund has higher turnover. Fund turnover does not replace but supplement the effect of country rotation in predicting returns.[6]

Country rotation can change simply from market valuation shift alone. In a value-weighted world index, if a country's market has a greater increase in valuation than others in a quarter, then this country will have a greater weight in this quarter. We examine whether country rotation from valuation-adjusted weights alone can predict returns. For each active fund in our sample, we identify the passive index funds in the same category. To do that, we compute country rotation in excess of passive index fund country weight changes. We find that the excess country rotation still predicts fund performance.

[5] For example, Berk and Green (2004) and Pastor, Stambaugh and Taylor (2017).
[6] Funds report turnover in annual frequency, while country rotations are available in quarterly frequency. To compare the two variables, we compute annual country rotations and find that annual country rotation can predict future returns even after controlling for funds' turnover.

We do a counterfactual test by limiting our data sample to passive funds and redo our analysis. If the country rotation-performance relation is due to skills in identifying profit opportunities, then index funds would not exhibit this. We find that country rotation no longer predicts future returns among passive index funds.

So far, our sample is based on active international funds with a global mandate for all countries. Regional funds have fewer countries to choose from because of their narrower mandate. As a result, fewer profit opportunities should be available for funds to exploit. We would expect country rotation to be less effective in predicting future returns in this case. Once we limit our data sample to regional funds, we find that indeed country rotation no longer predicts subsequent returns.

Portfolio weight changes in each country are the building block of country rotation. To understand further the source of the country rotation-performance relation, we examine funds' equity holdings in different countries in different quarters. We first document country characteristics that explain funds' change in country weights. We then examine whether fund country weight increases in a country are associated with subsequent positive fund country holding return and decompose the return into stock-picking vs. country market-timing components. Finally, we examine which country characteristics and manager characteristics are associated with higher performance for funds when they increase the country weights.

We find that funds' changes in country weights are related to the level of profit opportunities in these countries. The country-level proxies for profit opportunities we use include cross-border equity inflows and volatility. Higher cross-border portfolio equity inflows indicate foreign investors collectively perceive higher profit opportunities in the country market. The higher the cross-sectional volatility of individual stock returns, the higher the potential for profit opportunities and mispricing in the country market. Consistent with our hypothesis, we find that funds increase their holdings in countries with higher portfolio inflows and higher volatility.

When funds increase the portfolio weight in a country, they generate better country holding returns, which outperform relative to the fund's own returns from other holdings and relative to the funds' benchmark. For countries experiencing high cross-border equity inflows, fund country weight changes are associated with stronger market timing returns. When volatility is high, fund country weight changes positively and significantly predict stock picking returns.

Next, we seek to infer whether managers have good general investment skills are also good at exploiting opportunities in different markets. One way to define fund manager's skill is a general cognitive ability to process information and generate performance. (Kacpercyzk, van Nieuwerburgh and Veldkamp (2014)) Some managers of active international equity funds also manage active U.S. domestic equity funds. It is natural to think that fund managers who have better general cognitive ability would not only be skilled in their domestic investments but also in their international investments as well.

In our empirical test, we identify a group of such managers who are likely to have skills as they manage both domestic and international equity funds and have strong performance in their domestic funds. We find that for international funds with these skilled managers, their country weight changes can better predict subsequent fund country holding returns.

Given funds showcase their country allocations and the uncovered positive country rotation-performance relation, it seems natural to ask whether mutual fund investors recognize funds' ability to exploit opportunities in different markets. We find this is the case and funds with high country rotation attract significant flows. A one-standard-deviation increase in country rotation is associated with a 0.12% increase in monthly fund flows. This represents an 18% increase relative to the average monthly fund flows. Even after controlling for various fund characteristics, including past fund returns, country rotation still attracts flows. Meanwhile, we find both institutional and retail mutual fund investors recognize this ability and reward high country rotation funds with large flows.

The extant home bias literature has documented severe information asymmetry arising from language and knowledge barriers in international investing for U.S. investors. Mutual fund managers would have more resources, time, background, and attention to learn about foreign markets. Van Nieuwerburgh and Veldkamp (2009) establish theoretically the importance of building up information endowment on a selected set of countries and show that a portfolio concentration on these countries will lead to higher performance. Choi et al. (2017) test their theories and find that funds with concentrated country and industry portfolios have higher performance. Jagannathan, Jiao, and Karolyi (2020) find that international mutual fund managers who invest in their home countries outperform fund managers with no such country links. Cremers et al. (2016) study active equity funds in multiple countries and find that the average alpha generated by active management is higher in countries with more explicit indexing. Rather than

studying fund concentration on certain sets of countries or sectors, we study how international mutual funds change their country allocations from quarter to quarter.

Whether mutual fund managers are skilled is an important question in finance. Most domestic funds seem unskilled as they underperform their benchmarks.[7] Despite that, there is cross-sectional evidence that managers exhibit skills. Kacperczyk, Sialm, and Zheng (2005) propose the industry concentration measure and find that funds with more industry concentration perform better. Cremers and Petajisto (2009) and Petajisto (2013) construct the active share measure and show that funds with holdings much differing from benchmarks deliver superior performance. In the time series, Pastor, Stambaugh, and Taylor (2017) find US domestic funds with higher turnover have superior performance. Kacpercyzk, van Nieuwerburgh, and Veldkamp (2017) focus on the top quarter of fund managers with the highest stock-picking skills and establish that they can also time the market. Glassman and Riddick (2006) examine the market timing ability of global equity fund managers in the late 1980s and early 1990s, and document fund managers have some market timing abilities. Tsai and Wu (2015) decompose global fund returns and find no market timing abilities.

Relative to the prior literature, our paper provides new evidence on mutual funds skills by examining whether US active international funds can exploit time-varying profit opportunities in different countries. We find that funds generate overperformance when they have higher country rotation than normal in both the cross section and in the time series, especially when they trade. Our focus on U.S. international funds also makes sense in light of the finding in Berk and van Binsbergen (2015) that U.S. fund manager skills measured by value added are positively related to the fraction of fund assets held in foreign stocks.

Our paper also builds upon and contributes to the literature on mutual fund flows. Early work in the literature mainly studies U.S. domestic equity funds and establishes that fund flows respond to past fund performance and other factors. (e.g., Ippolito (1992), Sato, Levich, and Ramachandran (1994), Chevalier and Ellison (1997), Sirri and Tufano (1998), Christoffersen, Musto, and Wermers (2014)). There is very little research to date studying the flow patterns in

[7] Many studies (e.g., Jensen (1968), Malkiel (1995), Gruber (1996), Carhart (1997), French (2008), and Fama and French (2010) find that active portfolio managers fail to outperform passive benchmarks and destroy investors' value, but others (e.g., Grinblatt and Titman (1989, 1993), Grinblatt, Titman, and Wermers (1995), Daniel et al. (1997), Berk and Green (2004)) find that active portfolio managers do exhibit some stock-picking ability.

international equity mutual funds. In this study, we focus on the relation between country asset allocation and fund flows. We find that funds with high country rotation attract more flows.

2. Hypothesis development

Investment opportunities in different countries are constantly changing over time. Our study is based on a simple idea: an active international fund changes country asset allocation when it perceives time-varying profit opportunities in different countries. If the fund has the ability to identify and exploit such opportunities, then it should generate better performance after changing its country allocation more heavily. This leads to our first hypothesis.

Hypothesis 1. There is a positive relation between the country rotation of active international equity funds and their subsequent performance.

Different fund characteristics may affect the relation between country rotation and subsequent performance. Smaller funds can trade less liquid stocks because they typically trade in smaller dollar trading amounts, and they incur lower costs in their trades when they buy and sell in different countries. The larger pool and lower costs may contribute to stronger performance from country rotation. Also, it is reasonable to assume that more skilled funds would charge higher expenses and fees than less-skilled funds.[8] Funds with higher skills are more likely to perceive profit opportunities correctly, resulting in higher performance from country rotation. Finally, funds perceiving larger profit opportunities in different markets would trade more to exploit such opportunities. Hence, funds with higher turnover would have higher performance from country rotation. These rationales lead to the second hypothesis.

Hypothesis 2. The country rotation-performance relation is stronger among smaller funds and funds with higher expenses and turnover.

If funds change their country allocation to exploit profit opportunities in different countries, they should perform better in the countries to which they move assets. Funds would move more of

[8] For example, Kacperczyk, van Nieuwerburgh, and Veldkamp (2014) report that funds with superior stock-picking skill charge significantly higher expense ratios.

their assets to countries with higher profit opportunities. This leads to the third and fourth hypothesis.

Hypothesis 3. Active international equity funds also exhibit a positive relation between country weight changes and subsequent fund country holding returns.

and

Hypothesis 4. Active international equity funds exhibit a positive relation between country-level profit opportunities and country weight changes.

Active international equity funds report their country asset allocations in SEC disclosure, fund web pages, fund literature, and investment outlook. These country asset allocations are likely to draw investor attention. If investors perceive country rotations as funds having skills in actively exploiting investment opportunities in different countries, they would put more money into funds with higher country rotation. This leads to our last hypothesis.

Hypothesis 5. Active international equity funds with higher country rotation attract larger flows.

3. Data and summary statistics

We obtain information on U.S. international equity mutual funds from Morningstar. Morningstar reports fund holdings, fund managers' biographical information, fund assets, fund returns, and other fund-level characteristics. Stock returns data are obtained from Thomson Reuters Datastream International and the Center for Research on Security Prices (CRSP). Data on cross-border portfolio equity inflows and country market turnover are from World Bank. The data on recession for non-U.S. countries are from Economic Cycle Research Institute (ECRI), and we use the National Bureau of Economic Research (NBER) recession data for the U.S. market. We focus on active U.S. international equity funds with global investment mandates which includes funds in the following Morningstar categories, World Stock, Foreign Large Blend, Foreign Large Growth, Foreign Large Value, Foreign Small/Mid Blend, Foreign Small/Mid Growth, and Foreign Small/Mid Value. We include fund-quarters with at least $10 million total net assets and less than 50% of the total net assets in U.S. stocks. Our sample period is from 1991 to 2014.

Country rotation measures the extent to which a fund changes its country allocation between two quarters. Country rotation is defined as follows.

$$\text{Country rotation} = \frac{1}{2}\sum_{c=1}^{C}\left|w_{c,t} - w_{c,t-1}\right|,$$

where $w_{c,t}$ is the percentage of total net assets that a fund allocates to country *c* at the end of quarter *t.* The higher a fund's country rotation is the more assets a fund moves across countries between two quarters.

In Panel A of Table 1, we present the summary statistics. The average country rotation is 9%, implying that on average funds change their country allocations by 9% of their total assets between two quarters. Country rotation has a standard deviation of 6%. The 5th percentile of country rotation is at 3%, and the 95th percentile is at 20%. Thus, funds in our sample actively change country allocations over time, and there is considerable heterogeneity in the country rotation levels across different funds.

On average, we have 261 active U.S. international equity funds in our sample in a quarter. An average fund has approximately $1.7 billion assets under management. The average number of countries a fund invests in is 22, and the median is 21, suggesting funds in our sample indeed invest in a considerable number of countries on average. The average net of fee fund returns is 0.6% per month, and the average volatility of monthly fund net of fee returns is 4.7%. Morningstar assigns benchmark indexes to each category. Fund benchmark adjusted return is fund monthly net return plus expense ratio minus category benchmark return. The average fund benchmark adjusted returns are 0.16% per month. Fund flows are, on average, 0.7% per month. The average annual expense ratio is 1.4%, while the average annual turnover ratio is about 70%. Funds in our sample have an average fund age of 11 years.

Active share (Cremers and Petajisto (2009)) represents how much a fund's equity holdings differ from the benchmark index holdings. The average active share is 81% in our sample. Cremers and Petajisto (2009) and Cremers et al. (2016) define closet indexers as active funds with an active share below 60%. In our sample, the 5th percentile of active share is 62%. Thus, most of the funds in our sample are truly active funds.

Industry concentration (Kacperczyk, Sialm, and Zheng (2005)) measures how much a fund's industry allocations deviate from the industry allocations of the world market portfolio. We compute the industry allocations of the world market portfolio based on the stock market capitalization data reported by Datastream. The average industry concentration is 6%. The 95th percentile of industry concentration is 21%, suggesting some active international equity funds hold industry concentrated portfolios.

Country concentration measures how much a fund's country allocations deviate from the country allocations of the benchmark index. This measure is similar to the foreign concentration in Choi et al. (2017). On average, a fund in our sample deviates 29% of its total assets from its benchmark's country allocation. The 95th percentile of country concentration is 52%, suggesting some active international equity funds hold portfolios highly concentrated in a few countries.

Panel B of Table 1 reports the correlation matrix. On balance, country rotation is not strongly correlated with country concentration, active share, or industry concentration. The correlation between country rotation and country concentration is at 0.28. The correlation between country rotation and active share is 0.12, while the correlation between country rotation and industry concentration is 0.07.

4. Understanding active country allocation

4.1 Country rotation over time

Figure 1 presents the average annual country rotation over time. The average country rotation fluctuates around 10% till 2004 and then decreases over time to approximately 7% in 2014. In Figure 1, we also present the average turnover ratio over time and find average country rotation and average turnover comove with each other. Indeed, the correlation between annual country rotation and turnover is 0.53. Figure 2 shows that country rotation tends to be persistent. We first rank all funds into country rotation quintiles in each quarter. For all the funds in each quintile, we compute the average active country rotation four quarters before and four quarters after. We see, on average, funds in all five quintiles remain in their respective quintiles from four quarters before to four quarters after the formation quarter. For the quintile with the highest country rotation, the average country rotation is 18% in the formation quarter, 14% in quarter -4, and 13% in quarter

+4. For the quintile with the lowest country rotation, the average country rotation is 3.5% in the formation quarter, 5.5% in quarter -4, and 5.3% in quarter +4. Funds in the quintile with the highest country rotation exhibit the largest changes in their country rotation levels from quarter 4 (-4) to the formation quarter, suggesting funds with high country rotation are also more active in changing their country rotation levels. In Figure 2, we also present the average country rotation four years before and four years for each quintile and find similar patterns.

4.2 Country rotation, fund characteristics, and macro conditions

We relate average country rotation of funds to fund characteristics and macroeconomic conditions. In Table 2, we regress average country rotation in a year on various lagged fund characteristics and economic indicators as explanatory variables. The observations are at the fund-year level. The fund characteristics include fund size, return, fund risk, fund flows, expense ratio, turnover ratio, fund age, number of managers, and the percentage of fund assets owned through institutional share class. We also use the number of funds in the same Morningstar category to measure the competition in the active international equity fund industry. Market indicators include the MSCI World Index, world GDP growth rate, VIX index, and U.S. dollar factor and carry trade factor.[9] We include fund fixed effect to control for unobserved fund-level characteristics. To allow for intertemporal dependence of regression residuals at the level of funds, we also cluster standard errors at the fund level.

Table 2 Column 1 shows that fund size, fund past returns and fund age have negative and significant coefficients, while fund turnover is positive and significant. This means that smaller funds and funds with lower past returns exhibit significantly higher country rotation, while funds with higher turnover ratios are more active in country rotation. Table 2 Column 2 shows that aside from fund level variables, macroeconomic conditions can also affect the level of active country allocation. After a good performance in the world stock market in the previous year, funds tend to lower their country rotation. Higher carry trade returns in the previous year is associated with higher country rotation. After these macroeconomic conditions are taken into account, fund's own past returns no longer affect country rotation. Overall, our results show that fund size, age, turnover, as well as the macroeconomic conditions influence funds' country rotation decisions.

[9] We use the dollar and carry factors constructed in Lustig, Roussanov, and Verdelhan (2011).

5. Country rotation and fund performance

In this section, we examine the performance implications of country rotation. In particular, we seek to understand whether funds change their country allocations to exploit profit opportunities in different markets. Under hypothesis 1, there should be a positive relation between a fund's country rotation and subsequent performance.

5.1 Baseline results

We test Hypothesis 1 by running the regression:

$$R_{i,t} = \alpha + \beta * country\ rotation_{i,t-1} + \varepsilon_{i,t},$$

where $R_{i,t}$ is fund i's monthly net return plus expense ratio minus category benchmark return during month t and $country\ rotation_{i,t-1}$ is fund i's country rotation in the quarter prior to month t. We report the results in Table 3.

In Table 3 columns 1 and 2, we explore the time-series relation between country rotation and fund performance by including fund fixed effect in addition to month fixed effect. The fund fixed effect enables us to focus on within-fund time-series relations. This specification helps us to explore whether the same fund performs better when its country rotation increases. This coefficient on country rotation is 0.0069 with a t-statistics of 3.82. The standard deviation of country rotation is 6%. Thus, 0.0069 implies that a one-standard-deviation increase in a fund's country rotation translates into an increase in annualized fund benchmark adjusted returns of 0.5% (= 0.0069 × 0.06 × 12). This number is economically meaningful in that it is equivalent to a 26% increase relative to the average annualized fund benchmark adjusted return. In addition, Pastor, Stambaugh and Taylor (2017) find that among active U.S. domestic equity funds, a one-standard-deviation increase in a fund's turnover translates into an increase in annualized fund benchmark adjusted returns of 0.66% in the time-series regression. Thus, the impact of country rotation on international fund performance is comparable to the impact of overall trading activities on domestic fund performance.

Next, in columns 3 and 4, we document the cross-sectional relation using the model specification with only month fixed effect but no fund fixed effect. Here we examine whether

funds with higher country rotation perform better than funds with lower country rotation. The coefficient from the cross-sectional regression is 0.0038 with a t-statistics of 2.09. The coefficient 0.0038 implies that a one-standard-deviation increase in a fund's country rotation translates into an increase in annualized fund benchmark adjusted returns of 0.27% (= 0.0038 × 0.06 × 12).[10]

We also estimate the relation between country rotation and fund performance with control variables. The controls include fund size, fund risk, expense ratio, turnover ratio, fund age, number of managers, active share, industry concentration, and country concentration. The details of the construction of each control variable are described in Appendix 1.

Our control variables have been documented in prior studies to have impacted mutual fund performance. Chen, et al. (2004) find fund size erodes mutual fund performance. Jordan and Riley (2015) show that past fund return volatility is negatively related to future fund performance. Kacperczyk, van Nieuwerburgh, and Veldkamp (2014) report that funds with superior stock-picking skills charge significantly higher expense ratios.

Pástor, Stambaugh, and Taylor (2017) report a positive time-series relation between fund turnover and subsequent fund performance. Pástor, Stambaugh, and Taylor (2015) show that performance deteriorates over a typical fund's lifetime. Bär, Kempf, and Ruenzi (2011) find single managers are much more likely to achieve extreme (good or bad) performance outcomes. Cremers and Petajisto (2009) and Petajisto (2013) construct the active share measure, which represents how much a fund's equity holdings differ from the benchmark holdings and show that funds with holdings much differing from benchmarks deliver superior performance.

Country concentration measures how much a fund's country allocations deviate from its benchmark's country allocations. Choi et al. (2017) find funds with concentrated country portfolios have higher performance. Controlling for a fund's country concentration alleviates the concern that the country rotation-performance relation is driven by funds with higher country rotation holding more diversified portfolios and benefiting from international diversification.

Kacperczyk, Sialm, and Zheng (2005) propose the industry concentration measure, which captures how much a fund's industry allocations deviate from the industry allocations of the market portfolio and find that funds with more industry concentration perform better. There is also a debate about whether the benefits from international diversification come largely from the

[10] We also show that country rotation positive and significantly predicts fund performance based on Fama-MacBeth regressions in Table A2 of the Appendix.

diversity of industrial structures across countries (e.g., Roll (1992), Heston and Rouwenhorst (1994), and Griffin and Karolyi (1998)). We control for the fund's industry concentration, which alleviates the concern that funds with higher country rotation perform better because they hold more industry-diversified portfolios.

Among all these control variables, we find fund size is negatively related to fund performance in the time-series regressions in our sample. Active share and industry concentration are positively related to fund performance in the cross-sectional regressions. Importantly, after we control for all the control variables, the coefficients on country rotation remain positive and statistically significant after we control for these control variables.[11] This result confirms that the positive country rotation-performance relation is not driven by these control variables that could potentially fund performance. The coefficient on country rotation from the specification with control variables, fund fixed effect, and month fixed effect is at 0.0055 with a t-statistics of 2.64. The coefficient on country rotation from the specification with control variables and only month fixed effect is at 0.0050 with a t-statistics of 2.35. Overall, the findings in this subsection show that the relation between country rotation and fund performance is positive and significant in the time series and the cross section.

We focus on fund returns in our analysis. One question that may come up is whether a fund's Sharpe ratio also rises with country rotation. In Table A3 of the Appendix, we present evidence that funds with higher country rotation exhibit higher Sharpe ratio.

5.2 Country rotation-performance relations for different funds

In this subsection, we conduct additional analyses to assess whether the positive country rotation-performance relation is due to funds exploiting opportunities in different markets. Smaller funds incur fewer costs when they trade and can trade less liquid stocks as they trade in smaller trading amounts. The larger pool of potential investments and lower costs could contribute to superior returns from country rotation in these small funds. Skilled funds could charge higher expenses and fees than less-skilled funds. Thus, skilled funds as proxied by high expense are more likely to perceive profit opportunities correctly, and their country rotations would be more strongly

[11] We also regress fund benchmark adjusted returns on country rotation, Fama and French (2017)'s developed and emerging market factors, and dollar and carry currency factors (Lustig, Roussanov, and Verdelhan (2011)). The coefficients on country rotation remain positive and significant after controlling for these global risk factors. The results are shown in Table A1 of the appendix.

related to future fund performance. To exploit investment opportunities in different markets, funds need to trade. The high country rotation funds with high turnover would be more strongly related to future fund performance. These considerations lead to Hypothesis 2, which states that country rotation-performance relation is stronger among smaller funds and funds with higher expenses and turnover.

We test Hypothesis 2 in Table 4. We run regressions of subsequent month performance on fund's country rotation based on subsets of funds along three characteristics, fund size, expense ratio, and turnover ratio. We form groups of fund-month observations based on monthly terciles of fund size, expense ratio, and turnover ratio. For each of the characteristics, we first show the time-series regression results with fund fixed effects in addition to month fixed effect, and then show the cross-sectional results with only month fixed effect.

The first panel shows the results for funds in different terciles of size. Funds in the smallest size tercile have the strongest country rotation-performance relationship. The coefficient on country rotation is 0.0083 with a t-statistics of 2.76 in the time series, and 0.0075 with a t-statistics of 2.61 in the cross section. For the medium and largest tercile funds, the magnitude on the coefficient is smaller and insignificant or marginally significant. Consistent with hypothesis 2, smaller funds have lower transaction costs, and their country rotations increase the future returns the most.

The second panel shows the results for funds in different expense ratios. The country rotation-performance relationship is the most significant economically and statistically for the high expense fund. The relationship monotonically decreases as we go from high to medium to low expense funds. Higher expense funds presumably have higher skills, and their country rotation increases the future returns the most.

The third panel shows the results for funds in different turnover terciles. Among funds with high turnover ratio, the coefficient on country rotation is 0.0085 with a t-statistics of 2.90 in the time-series regression. For funds with low and medium turnover ratios, the country rotation-performance relationship is weak economically and statistically. The results are the same in the time series as in the cross section. Country rotations are more associated with future returns for those funds that trade more to exploit profit opportunities. Overall, consistent with Hypothesis 2,

we find that the country rotation-performance relation concentrates on smaller, high-expense, and high-turnover funds.

Pastor, Stambaugh and Taylor (2017) propose fund turnover as a way to measure domestic funds' exploitation of profit opportunities in the US, while we propose country rotation as a measure for international funds' exploitation of profit opportunities in different countries. In Figure 1, we show that average country rotation and average turnover comove with each other over time. In Figure 3, we use quantile regressions to depict the relation between turnover and country rotation. We find that country rotation is more closely related to turnover among funds with high country rotation. For example, when a fund has the country rotation around the 95th percentile in the country rotation distribution, a one-standard-deviation increase in turnover is associated with a 0.8 standard-deviation increase in country rotation. Since only cross-border trading can generate high levels of country rotation and turnover at the same time, this finding suggests country rotation is a good proxy for funds trading activities to exploit opportunities in different markets among funds with high country rotation.

Meanwhile, in Table 3, we find country rotation positively predicts international fund performance after we control for fund turnover ratio. In Table 4, we show the country rotation-performance relation is stronger among high-turnover funds. We also notice that country rotation is computed in a quarterly frequency, while funds report turnover in annual frequency. To make a fairer comparison, in Table A4 of the appendix, we compute annual country rotation by averaging the four quarterly country rotation values in a year. We again find that annual country rotation predicts future fund returns even after controlling for funds' annual turnover. Together, these findings indicate that funds' turnover does not replace but supplement the effect of country rotation in predicting high returns.

We measure country rotation using the country weight changes. However, even for active international equity funds, part of the country weight changes can be simply driven by market valuation shifts. In a value-weighted world index, for example, if a country's market has a greater increase in valuation than others in a quarter, then this country will have a greater weight in this quarter. In Table A5 of the appendix, therefore, we examine whether country rotation from valuation-adjusted weights alone can predict returns. For each active global fund in our sample, we identify the passive index funds in the same category. We then compute country rotation in

excess of passive index fund country weight changes. We confirm that excess country rotation positively and significantly predicts fund performance.

The country allocations of international index funds can change over time because of valuation effects. Due to their mandates, international index funds, however, do not actively exploit opportunities in different markets. If the positive country rotation-performance relation is due to skills in identifying profit opportunities, then only active funds should exhibit this relationship, and international equity index funds should not exhibit the relationship.

We conduct a counterfactual based on international index funds. In table 5, we limit our data sample to international index funds only and rerun the regressions of subsequent performance on country rotations. We find that country rotation no longer predicts future returns among international equity index funds.

Until now, our sample consists of active international mutual funds with global investment mandates. Active international equity funds can include funds focusing on a region. Active international equity funds with regional investment mandates include funds in the following Morningstar categories: Diversified Emerging Mkts, Diversified Pacific/Asia, and Pacific/Asia ex-Japan Stock, China Region, India Equity, Japan Stock, Europe Stock, Latin America Stock. If the positive country rotation-performance relationship in global funds is due to skills in identifying profit opportunities in different countries, then the narrower geographical scope of active regional funds would weaken the relationship. We, therefore, expect to find that the country rotation-performance relation is weaker among active regional funds. Table 5 shows the results. In both time series and cross section, we find that country rotation no longer predicts subsequent returns among active regional funds.

5.3 Common variation in country rotation

The investment opportunities in different countries could be driven by market-wide causes such as political policy changes, cultural events, liquidity conditions, public health crisis, investor sentiment, among others. These market-wide factors can shape country stock market performance, cause common perceptions by fund managers to change, and make many funds adjust their country allocations at the same time. Thus, it seems natural to examine the extent to which country rotation is common across funds.

To see whether the commonality in country rotation exists, for each fund-quarter, we compute the average country rotation of all other funds in the same Morningstar style category. If many funds collectively identify and exploit certain market-wide opportunities in different markets, then average country rotation should be positively related to country rotation and positively related to fund performance.

In Panel A of Table 6, we regress the country rotation of a fund on the average country rotation. We find that average country rotation is positively and significantly related to a fund's country rotation. And we find that the relation between country rotation and the average country rotation is stronger among funds with higher country rotation. Panel B of Table 6 shows that as average country rotation increases, subsequent fund performance also increases. This effect holds when we add country rotation as the control variable. Overall, our finding suggests that in periods when there are greater investment opportunities among certain countries, funds may collectively perceive such opportunities.

6. Do funds perform better in a country when they increase the weight in that country?

All our analyses so far focus on the country rotation and performance at the fund level. The building block of our country rotation measure is the country weight change in each country. If funds adjust their country asset allocations to exploit opportunities in different countries, then as stated in Hypothesis 3, we expect funds to perform better in a country when they increase the portfolio weights in that country. Thus, it is natural to extend our analysis to the fund-country level and delve into fund equity holdings.

6.1 Baseline results

In Table 7, we run the regression:

$$R_{i,c,t} = \alpha + \beta * \mathrm{CW}\Delta_{i,c,t-1} + \varepsilon_{i,c,t},$$

where $R_{i,c,t}$ is the monthly returns of fund *i*'s equity holdings in country *c* during month *t* and $\mathrm{CW}\Delta_{i,c,t-1}$ is fund *i*'s portfolio weight change in country *c* in the quarter prior to month *t*. Fund country holding return is the monthly return of a fund's equity holdings in a country. We include

fund fixed effect and month fixed effect to examine the cross-sectional relation, namely whether funds perform better in the countries with higher country weight changes than in the countries with lower country weight changes. We then include fund fixed effect, country fixed effect, and month fixed effect to examine the time-series relation, namely whether funds perform better in a country when they increase the country weights in that country.

We find β is positive and statistically significant in both the time-series and cross-sectional regressions. In the time-series regressions, β is 0.0237 with a t-statistics of 1.99. In the cross-sectional regressions, β is 0.0259 with a t-statistics of 2.17. The standard deviation of $\mathrm{CW}\Delta_{i,c\,t-1}$ is 0.0122. Thus, a coefficient of 0.0259 means that a one-standard-deviation increase in country weights is associated with a 0.38% (= 0.0259 × 0.0122 × 12) annualized increase in fund country holding return. These findings confirm that funds perform better in a country after they increase the portfolio weighs in that country.

One natural question to ask is whether funds have stock picking or country market timing skills when they change their country holdings. In Column 2 and 3 of Table 7, we decompose fund country holding return into a stock-picking component: fund country holding return minus country market return and a market-timing component: country market return. We compute monthly country stock market returns for non-U.S. countries by value-weighting all the primary common stock shares in a country in the Thomson Reuters Datastream International datasets. We use the CRSP value-weighted market returns as the U.S. monthly returns. We regress these two components on country weight change, respectively. We find that country weight changes positively and significantly predict country market return. This result suggests that funds on average exhibit country market timing skills. The country weight changes do not significantly predict fund country holding return minus country market return. This means that the stocks the funds pick do not outperform the country indices where the stocks are located. This indicates that funds do not have the ability to pick foreign stocks that outperform their respective country indices.

We then run the regression using fund country holding return using alternative benchmarks. In column 4 of Table 7, we use fund country holding returns in excess of fund return as dependent variable. This assesses whether the fund's country holding returns is above the overall fund returns, which consist of the funds' other holdings. In column 5, we examine fund country holding return in excess of fund benchmark return as the dependent variables. This assesses whether the funds'

country holding returns is above that of the Morningstar benchmark. In both cases, we still observe positive and significant β, suggesting that as funds' new country holdings change outperform both benchmarks. Overall, the results is consistent with funds being skillful in their country holding changes.

Part of the country weight changes can be simply from market valuation effects. We use the country weight change by the benchmark index funds as the proxy for the country valuation effects. In Table A6 of the appendix, we interact fund country weight change and the country weight change in the same country by the index funds. After including this interaction term in the regression, the coefficient on fund country weight change alone reflects the relation between fund country weight change and fund country holding return (i.e. when the country weight change by index funds is zero). We find that the coefficients on fund country weight change are very similar to those in Table 7. This suggests that valuation effects do not drive the relation between fund country weight change and fund country holding return.

In subsection 5.3, we show that the average country rotation can predict fund performance because some investment opportunities are driven by market-wide causes in a country, and many funds exploit such opportunities at the same time. In Table A7 of the appendix, we follow the same logic and test whether the average country weight change can predict fund country holding returns. We find that the average country weight change positively and significantly predicts country market returns but negatively predicts the stock-picking component of fund country holding returns. The results hold after we add fund country weight change as the control variable. These results suggest that many international funds collectively exploit the market-wide investment opportunities that impact country stock market returns.

6.2 Country-level investment opportunities

In the previous subsection, we establish that country weight changes can predict fund country holding returns. Naturally, we would expect this relation to be stronger among countries with greater investment opportunities. In this subsection, we use three country-level proxies for profit opportunities in different countries: portfolio equity inflows, volatility, and country market turnover. Portfolio equity inflows are the cross-border capital inflows to equity securities in a

country. Volatility is the cross-sectional standard deviation of individual stock monthly returns for all stocks in a country. Country market turnover is the value of domestic shares traded divided by their market capitalization.

Higher portfolio equity inflows indicate foreign investors collectively perceive higher profit opportunities in one country's market. The higher the cross-sectional volatility of individual stock returns, the higher the potential for profit opportunities and mispricing in the country market.

Country market turnover measures the level of liquidity in a country. Empirical evidence suggests that lower liquidity is accompanied by lower market efficiency and thus higher potential for mispricing (e.g., Chordia, Roll, and Subrahmanyam (2008, 2011)). On the other hand, lower liquidity also implies higher transaction costs, which could discourage funds from exploiting opportunities in a country and lowering investment profits. Given these two conflicting effects of market liquidity, it is an empirical question whether countries with a higher level of country market turnover have better investment opportunities.

In Panel A of Table 8, we first document that the changes in country weights are related to the level of profit opportunities in these countries. We regress country weight changes on the three country-level variables. We also include whether a country is in a recession as the control variable. Overall, we find that funds increase their portfolio weights in countries with higher portfolio equity inflows and higher volatility. Given the conflicting effects of market liquidity, country market turnover is not significantly related to fund country weight changes. Recession is not significantly related to fund country weight changes.

In Panel B of Table 8, we distinguish funds along with portfolio equity inflow, volatility, and country market turnover and run the fund-country level performance tests similar to those in Table 7. We form groups based on quarterly terciles of portfolio equity inflow, volatility, and country market turnover. We find that the relation between fund country weight change and fund country holding return concentrate in periods when a country's portfolio equity inflow is high, cross-sectional volatility is high, and market turnover is at the medium level. These findings confirm that the relation between country weight change and fund country holding returns is stronger among countries with higher investment opportunities as proxied by portfolio equity inflow, cross-sectional volatility, and country market turnover.

Decomposing fund country holding return into the stock-picking component and market-timing component reveals that portfolio equity inflow mainly affects funds' ability to time country market returns. For countries experiencing large portfolio equity inflows, a one-standard-deviation increase in country weights leads to an increase in annualized country market returns of 0.46% (= 0.0313 × 0.0122 × 12). Large cross-border equity inflows can boot a country's stock market. And active international funds seem to be able to gather the information and move their assets to countries with large cross-border equity inflows.

Meanwhile, we find volatility mainly affects funds' ability of stock picking in a country. Among countries with high volatility, country weight changes can significantly predict stock picking returns. A one-standard-deviation increase in country weights leads to an increase in annualized stock picking returns of 0.44% (= 0.0298 × 0.0122 × 12). Finally, country market turnover affects both the stock-picking and the market timing components. For countries with a medium level of market turnover, a one-standard-deviation increase in country weights leads to an increase in annualized stock picking returns of 0.62% (= 0.0421 × 0.0122 × 12) and an increase in annualized country market returns of 0.39% (= 0.0264 × 0.0122 × 12).

6.3 Fund manager skills

Kacpercyzk, van Nieuwerburgh and Veldkamp (2014) define fund manager's skill as a general cognitive ability to generate outperformance either through market timing or stock picking. It is natural to think that fund managers who have better general cognitive ability would not only be skilled in their domestic investments but also in their international investments as well. We test this hypothesis by exploiting the phenomenon that some managers of active international equity funds also manage active U.S. domestic equity funds. We infer these managers' skills from their performance in managing active domestic equity funds and examine their skills in exploiting opportunities in different markets.

We identify skilled managers as the ones showing good performance in their active U.S. domestic equity funds during our 1991 to 2014 sample period. For each manager-quarter, we first calculate the average fund benchmark adjusted returns in the following three months among the manager's active U.S. domestic equity funds. We then form a group of manager-quarters with the

top 25% average fund benchmark adjusted returns. Skilled managers are the top 25% managers with the highest fraction of quarters in that group relative to the total number of quarters.

In Table 9, we run regression of fund country holding returns on the change of country weight. The result shows that among funds managed by skilled managers, their fund country weight changes can better predict fund country holding returns. A one-standard-deviation increase in country weights leads to an increase in annualized fund country holding returns of 0.83%. For funds without skilled managers, however, a one-standard-deviation increase in country weights only leads to an increase in annualized fund country holding returns of 0.26%. The benefits of having skilled managers mainly come from better country market timing. Among funds with skilled managers, a one-standard-deviation increase in country weights leads to an increase in annualized country market returns of 0.58%. Overall, the findings in this subsection indicate that managers' skills contribute to the funds' abilities to exploit investment opportunities in different markets.

7. Country rotation and fund flows

Active international equity funds showcase and market their country allocation on fund web pages and literature. Many funds report equity holdings by country and display country portfolio weights in SEC filings. In the previous section, we also show that country rotation leads to superior fund performance. Therefore, it is natural to examine whether investors pay attention to country rotation and thus reward funds with higher levels of country rotation with greater fund flows. Hypothesis 4 states that funds' flows will increase for funds with higher country rotation.

In Table 10, we regress a fund's monthly fund flows on its country allocation.[12] The regressions include the standard variables used in the literature to predict fund flows: fund size, fund return, fund risk, expense ratio, turnover, number of managers, and fund age. We also include active share, industry concentration, country concentration as control variables to differentiate the effects of these measures of fund activeness. Similar to our performance regressions, we also run

[12] We link active country allocation at a quarter end to three monthly flows starting from the third month after the quarter end. This helps guarantee active country allocation information is available to investors, since funds can delay the postings of equity holdings.

both the time-series regression, which includes fund fixed effect and month fixed effect, and the cross-sectional regression, which includes only the month fixed effect.

We find that country rotation is positively and significantly related to fund flows in both time-series and cross-sectional regressions. The magnitude of this effect is economically meaningful. In the time-series regression, a one-standard-deviation increase in country rotation is associated with a 0.12% (= 0.0206 × 0.06 × 12) increase in monthly fund flows, namely an 18% increase relative to the average monthly fund flows. In the cross-sectional regression, a one-standard-deviation increase in country rotation is associated with a 0.18% (= 0.02976 × 0.06 × 12) increase in monthly fund flows, a 25% increase relative to the average monthly fund flows. These findings suggest that when a fund increases its country rotation level, investors tend to invest more money in this fund. And when comparing two different funds, investors also tend to invest more money in the fund with a higher country rotation level.

In Table 10, we also classify funds into institutional-oriented funds and retail-oriented funds. A fund is classified as an institutional-oriented (retail-oriented) fund if more than 80% (less than 20%) of fund assets are owned through the institutional share class. We show country rotation is positively related to fund flows among both institutional-oriented and retail-oriented funds. Thus, both institutional-oriented investors and retail investors could recognize the superior performance related to country rotation.

Since investors might not necessarily assess the changes of a fund's country asset allocation quarterly, we construct two alternative measures of country rotation. The first alternative averages a fund's rotation over the recent four quarters. The second alternative compares a fund's country allocation with a 12-month gap. We find that both alternative measures of country rotation positively and significantly attract fund flows.

Finally, we also analyze the relation between country rotation and fund flows among international equity index funds. International equity index funds, by definition, leave no room for portfolio managers to actively manage their country allocation. If investors treat country rotation as actively chasing opportunities across countries, they should not reward country rotation for index funds. We find that country rotation is not significantly related to flows among index funds.

8. Conclusion

Active international equity mutual funds have gained great popularity and become the primary investment vehicles for domestic investors to get international exposure in recent decades. In this study, we use country rotation to measure how much a fund changes its country allocation a quarter. We find that active international funds with high country rotation generate superior performance and positive flows. We also find that a fund's change of holding in a country is positively associated with the future benchmark-adjusted returns in the country holdings, mostly due to country market timing. Our results suggest that active international funds are able to exploit profit opportunities across countries.

By 2020, there are about 1,400 active U.S. international equity funds (Investment Company Fact Book 2021). With so many international funds to choose from, it can be bewildering for investors who try to compare across them. Country rotation is an intuitive measure and provides an important metric on international funds that would be useful for investors to know.

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Figure 1: Average Country Rotation and Turnover Over Time

The figure below shows the average level of country rotation and turnover ratio between 1991 and 2014. We equally weight each fund's country rotation and turnover ratio.

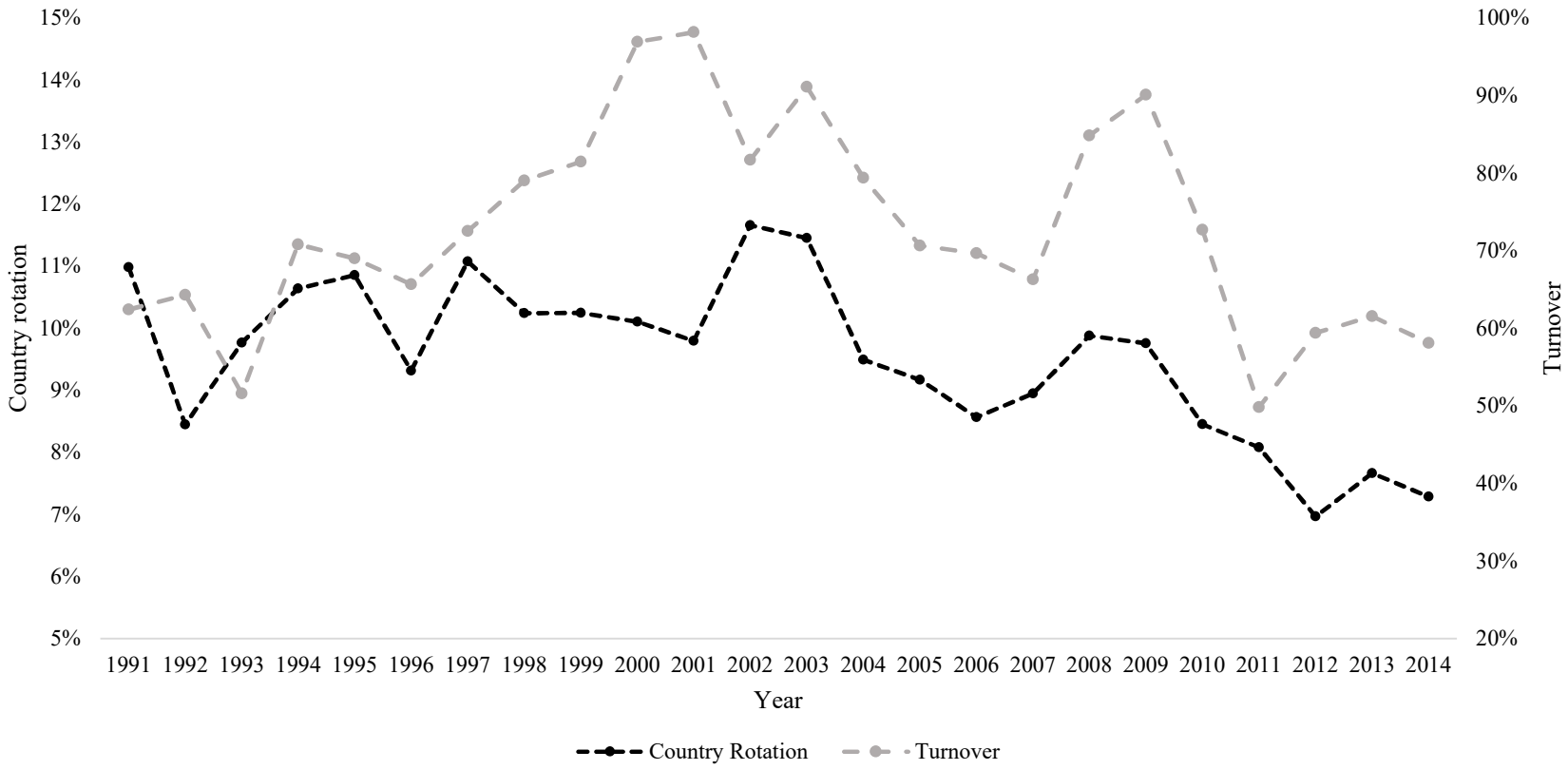
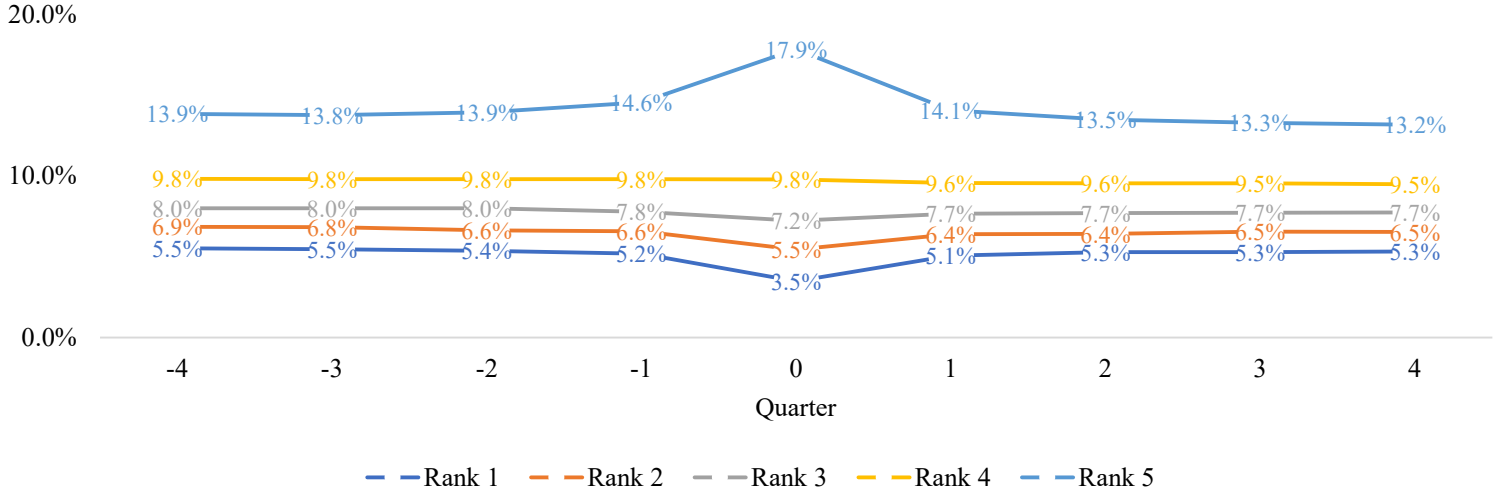


Figure 2: Persistence of Country Rotation

The figures below present the persistence of country rotation. The sample includes active U.S. international equity funds with global investment mandates from 1991 to 2014. We categorize funds into five groups based on their country rotation in quarter/year 0. We present the average country rotation of the five groups four quarters/years before and four quarters/years after quarter/year 0.



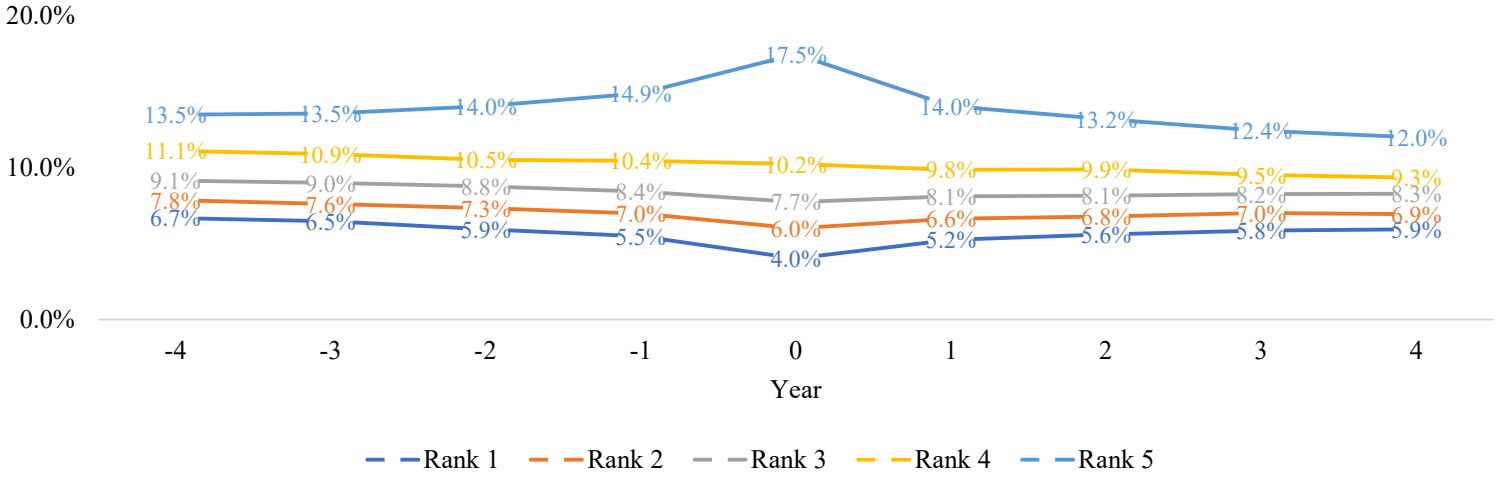


Figure 3: Country Rotation and Turnover Ratio

The figure below shows the relation between country rotation and turnover. We run quantile regressions: $Country\ rotation_{i,t} = \alpha + \beta * Turnover_{i,t} + \varepsilon_{i,t}$, where $Country\ rotation_{i,t}$ is fund i's average country rotation in year t and $Turnover_{i,t}$ is fund i's turnover ratio in year t. $Country\ rotation_{i,t}$ and $Turnover_{i,t}$ are standardized and with zero mean and standard deviation of one. We plot the coefficient β in different country rotation quantiles. Shaded area represents the confidence interval.

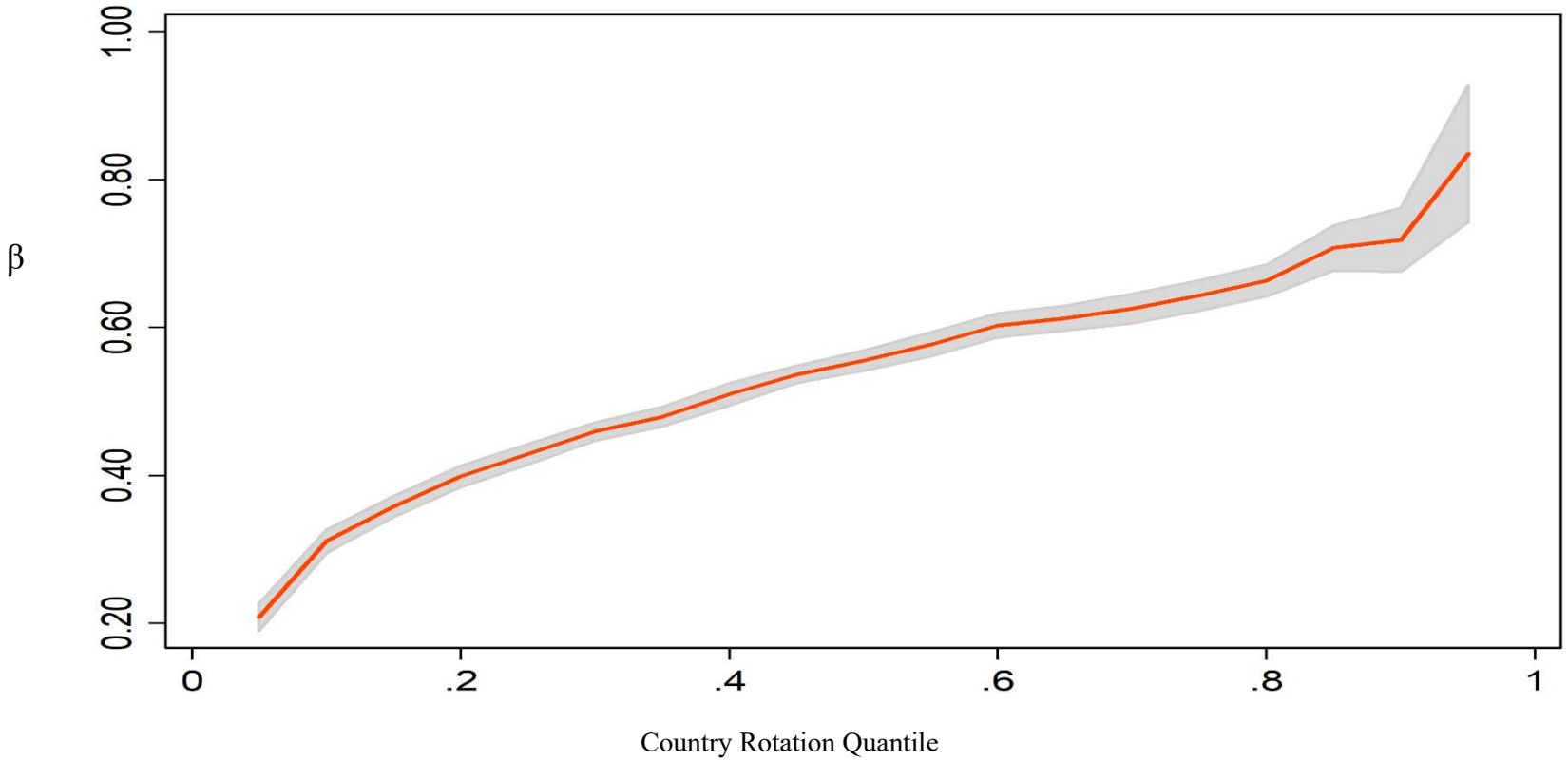


Table 1: Summary Statistics

The table below summarizes the characteristics of active U.S. international equity mutual funds with global investment mandates between 1991 and 2014. In Panel A, we present the summary statistics. In Panel B, we report the correlation matrix. Country rotation is computed as $\frac{1}{2}\sum_{c=1}^{C}\left|w_{c,t} - w_{c,t-1}\right|$, where $w_{c,t}$ is the percentage of total assets a fund allocates to country c at the end of quarter t. Definitions of other variables are in the Appendix.

Panel A: Summary statistics

	Mean	Median	SD	5th	95th
Country rotation	9%	7%	6%	3%	20%
No. of funds	261	294	159	20	472
Fund size ($ millions)	1,672	259	6,557	20	6,668
No. of countries	22	21	8	12	36
Fund return (monthly)	0.6%	1.0%	5.2%	-9.0%	8.1%
Fund benchmark adjusted return (monthly)	0.16%	0.1%	0.2%	-2.71%	3.11%
Fund risk (monthly)	4.7%	4.3%	2.1%	2.2%	8.7%
Fund flows (monthly)	0.7%	-0.1%	6.5%	-5.3%	8.8%
Expense ratio (annual)	1.4%	1.3%	0.5%	0.7%	2.2%
Turnover (annual)	70%	54%	58%	10%	181%
Fund age	11	9	9	2	24
Active share	81%	83%	11%	62%	96%
Industry concentration	6%	4%	7%	1%	21%
Country concentration	29%	24%	14%	14%	52%

Panel B: Correlation matrix

Correlation	Country rotation	Active share	Industry concentration	Country concentration
Country rotation	1			
Active share	0.1175	1		
Industry concentration	0.0666	0.3482	1	
Country concentration	0.2776	0.3040	0.1624	1

Table 2: Explaining Country Rotation

This table analyzes the determinants of country rotation. The dependent variable is country rotation. The observations are at the fund-year level. All independent variables are lagged by one year. Fund size, Fund age, No. of funds in a category, and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered at the fund level. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Country rotation	
	(1)	(2)
Fund size	-0.0027***	-0.0027***
	(-2.64)	(-2.60)
Fund return	-0.0123***	-0.0080
	(-5.03)	(-1.28)
Fund risk	0.0081	0.0319
	(0.24)	(0.43)
Fund flows	0.0000	-0.0000
	(0.00)	(-0.03)
Expense ratio	0.2542	0.1792
	(0.59)	(0.41)
Turnover	0.0163***	0.0161***
	(6.99)	(6.89)
Fund age	-0.0131***	-0.0112***
	(-4.69)	(-3.45)
No. of managers	-0.0007	-0.0008
	(-0.41)	(-0.47)
Institutional share weight	-0.0099	-0.0092
	(-1.19)	(-1.11)
No. of funds in a category	0.0038	0.0021
	(0.92)	(0.50)
World market return		-0.0207**
		(-2.58)
World GDP growth rate		0.0154
		(0.27)
VIX		-0.0135
		(-0.51)
Dollar factor		0.2780
		(1.61)
Carry factor		0.2759**
		(2.53)
Constant	0.1414***	0.1461***
	(5.18)	(5.37)
Fund FE	Y	Y
Adjusted R^2	0.5766	0.5647
Observations	5064	5064

Table 3: Country Rotation and Fund Performance

This table presents the effects of country rotation on fund performance. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. Fund size, Fund age, and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series		Cross-sectional	
	(1)	(2)	(3)	(4)
Country rotation	0.0069***	0.0055***	0.0038**	0.0050**
	(3.82)	(2.64)	(2.09)	(2.35)
Fund size		-0.0016***		0.0001**
		(-10.44)		(2.47)
Fund risk		-0.0113		0.0180
		(-0.28)		(0.47)
Expense ratio		-0.0548		0.0438*
		(-1.10)		(1.87)
Turnover		0.0003		-0.0001
		(0.87)		(-0.48)
Fund age		0.0008		-0.0002
		(1.40)		(-1.54)
No. of managers		0.0004*		-0.0000
		(1.77)		(-0.40)
Active share		0.0050*		0.0030**
		(1.80)		(1.99)
Country concentration		-0.0013		-0.0010
		(-0.68)		(-0.88)
Industry concentration		0.0106		0.0084**
		(1.34)		(2.17)
Constant	0.0007***	0.0276***	0.0009***	-0.0054*
	(2.60)	(7.08)	(3.68)	(-1.92)
Fund FE	Y	Y		
Month FE	Y	Y	Y	Y
Adjusted R^2	0.1680	0.1683	0.1610	0.1596
Observations	63258	51704	63258	51704

Table 4: Country Rotation and Fund Performance, Differences across Funds

This table presents the effects of country rotation on fund performance vary across funds. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. We distinguish funds along three characteristics: fund size, expense ratio, and turnover ratio. Groups are formed on monthly terciles of fund size, turnover ratio, and expense ratio. We include the same control variables as in Table 3. For brevity, we do not report the coefficients on control variables. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Fund size group

	Time-series			Cross-sectional		
	Large	Medium	Small	Large	Medium	Small
Country rotation	-0.0004	0.0062*	0.0083***	0.0040	0.0031	0.0075***
	(-0.10)	(1.78)	(2.76)	(1.00)	(0.95)	(2.61)
Controls	Y	Y	Y	Y	Y	Y
Fund FE	Y	Y	Y			
Month FE	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.1903	0.1730	0.1789	0.1795	0.1575	0.1553
Observations	18009	18119	15576	18009	18119	15576

Panel B: Expense ratio group

	Time-series			Cross-sectional		
	High	Medium	Low	High	Medium	Low
Country rotation	0.0078**	0.0069*	0.0028	0.0085***	0.0039	0.0010
	(2.35)	(1.91)	(0.89)	(2.82)	(1.10)	(0.39)
Controls	Y	Y	Y	Y	Y	Y
Fund FE	Y	Y	Y			
Month FE	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.2029	0.1795	0.1734	0.1899	0.1649	0.1679
Observations	17360	17380	16964	17360	17380	16964

Panel C: Turnover group

	Time-series			Cross-sectional		
	High	Medium	Low	High	Medium	Low
Country rotation	0.0085***	0.0029	0.0045	0.0068**	0.0045	0.0052
	(2.90)	(0.83)	(1.00)	(2.51)	(1.39)	(1.37)
Controls	Y	Y	Y	Y	Y	Y
Fund FE	Y	Y	Y			
Month FE	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.2587	0.1865	0.1713	0.2457	0.1663	0.1499
Observations	17373	17637	16694	17373	17637	16694

Table 5: Country Rotation and Fund Performance, Index Funds and Active Regional Funds

This table presents the effects of country rotation on fund performance among index funds and active regional funds. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. We include the same control variables as in Table 3. For brevity, we do not report the coefficients on control variables. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Index Fund		Active Regional Fund	
	Time-series	Cross-sectional	Time-series	Cross-sectional
Country rotation	0.0016	0.0021	-0.0007	-0.0031
	(0.79)	(1.12)	(-0.12)	(-0.65)
Controls	Y	Y	Y	Y
Fund FE	Y		Y	
Month FE	Y	Y	Y	Y
Adjusted R^2	0.9908	0.9906	0.1712	0.1615
Observations	2202	2202	20622	20622

Table 6: Average Country Rotation and Fund Performance

This table presents the effects of average country rotation on fund performance. In Panel A, we regress country rotation on AvgCountry rotation. AvgCountry rotation is the average country rotation of all other funds in the same Morningstar category. Country rotation and AvgCountry rotation are standardized and with zero mean and standard deviation of one. We distinguish funds along the quarterly terciles of country rotation. The standard errors are clustered by fund and by year. In Panel B, the dependent variable is fund monthly net return plus expense ratio minus category benchmark return. We include the same control variables as in Table 3. For brevity, we do not report the coefficients on control variables. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Commonality in country rotation

	All Sample	High Country Rotation	Medium Country Rotation	Low Country Rotation
AvgCountry rotation	0.2022***	0.2999***	0.1645***	0.1011***
	(9.44)	(9.04)	(9.26)	(8.92)
Fund FE	Y	Y	Y	Y
Adjusted R^2	0.3828	0.3483	0.3817	0.4240
Observations	25472	8194	8745	8533

Panel B: Average country rotation and fund performance

	All Sample	
AvgCountry rotation	0.0007**	0.0007**
	(2.10)	(2.09)
Country rotation		0.0003***
		(2.65)
Controls	Y	Y
Fund FE	Y	Y
Month FE	Y	Y
Adjusted R^2	0.1684	0.1686
Observations	51676	51676

Table 7: Country Rotation and Fund Performance, Fund-Country-level Analysis

This table presents the effects of country rotation on fund performance at the fund-country level. We run the regressions: $R_{i,c,t} = \alpha + \beta * \mathrm{CW}\Delta_{i,c\,t-1} + \varepsilon_{i,c,t}$, where $R_{i,c,t}$ is the monthly returns of fund *i*'s equity holdings in country *c* during month *t* and $\mathrm{CW}\Delta_{i,c,t-1}$ is fund *i*'s portfolio weight change in country *c* in the quarter prior to month *t*. Fund country holding return is the monthly return of a fund's equity holdings in a country. Country market return is a country's monthly stock market return. Fund return is fund monthly net return plus expense ratio. Benchmark return is the monthly returns of category benchmark index. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series				
	(1)	(2)	(3)	(4)	(5)
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0237**	0.0001	0.0234***	0.0234**	0.0232*
	(1.99)	(0.01)	(3.12)	(1.97)	(1.95)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3739	0.0450	0.6229	0.0264	0.0349
Observations	1307460	1307460	1307460	1307460	1307460

	Cross-sectional				
	(1)	(2)	(3)	(4)	(5)
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0259**	-0.0002	0.0258***	0.0255**	0.0254**
	(2.17)	(-0.02)	(3.42)	(2.15)	(2.13)
Fund FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3729	0.0444	0.6210	0.0249	0.0334
Observations	1307460	1307460	1307460	1307460	1307460

Table 8: Country Rotation and Fund Performance, Fund-Country-level Analysis, Country-level Opportunities

Panel A presents the estimates of country weight changes regressed on country-level variables. We run the regressions: $\mathrm{CW}\Delta_{i,c\,t} = \alpha + \beta * \mathrm{X}_{i,c\,t} + \varepsilon_{i,c,t}$, where $\mathrm{CW}\Delta_{i,c\,t}$ is fund i's country weight change in country c during quarter t and $\mathrm{X}_{i,c\,t}$ represents country-level variables during quarter t. Country-level variables include volatility, country market turnover, portfolio equity inflow, and recession. Portfolio equity inflow is the cross-border capital inflows to equity securities in a country in $trillion. Volatility is the cross-sectional standard deviation of individual stock monthly returns for all stocks in a country. Country market turnover is the value of domestic shares traded divided by their market capitalization and is taken the natural logarithm. Recession indicates whether a country in a month is in the recessionary period classified by ECRI and NBER. The standard errors are clustered by category × country × quarter. Panel B runs the regressions: $R_{i,c,t} = \alpha + \beta * \mathrm{CW}\Delta_{i,c\,t-1} + \varepsilon_{i,c,t}$, where $R_{i,c,t}$ is the monthly returns of fund i's equity holdings in country c during month t and $\mathrm{CW}\Delta_{i,c,t-1}$ is fund i's portfolio weight change in country c in the quarter prior to month t. Fund country holding return is the monthly return of a fund's equity holdings in a country. Country market return is a country's monthly stock market return. We distinguish funds along portfolio equity flow, volatility, and country market turnover. Groups are formed on quarterly terciles of portfolio equity inflow, volatility, and country market turnover. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Country weight change and country-level opportunities

Portfolio equity inflow	0.0077***			0.0072***	0.0112***
	(3.59)			(3.33)	(3.32)
Volatility		0.0134***		0.0151***	0.0200***
		(11.18)		(10.67)	(8.95)
Country market turnover			-0.0002	-0.0002*	-0.0001
			(-1.63)	(-1.70)	(-0.58)
Recession					-0.0003
					(-1.02)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y
Adjusted R^2	0.0034	0.0040	0.0028	0.0042	0.0046
Observations	525905	537348	486339	474129	298745

Panel B: Country-level opportunities and fund country holding return

Fund country holding return									
	Portfolio Equity Flow			Volatility			Market Turnover		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
CWΔ	0.0334***	-0.0240	-0.0394*	0.0415***	0.0047	-0.0154	0.0018	0.0684***	-0.0198
	(2.72)	(-0.77)	(-1.79)	(2.76)	(0.35)	(-0.75)	(0.14)	(3.56)	(-0.49)
Fund FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.3809	0.2762	0.4657	0.3886	0.3824	0.4126	0.4464	0.3299	0.3251
Observations	797625	166558	292483	431709	472711	382246	721365	353542	90727

Fund country holding return – country market return									
	Portfolio Equity Flow			Volatility			Market Turnover		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
CWΔ	0.0022	0.0098	-0.0213	0.0298**	-0.0014	-0.0292**	-0.0128	0.0421***	0.0507
	(0.26)	(0.36)	(-1.60)	(2.40)	(-0.17)	(-2.02)	(-1.57)	(2.82)	(1.37)
Fund FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.0479	0.0468	0.0714	0.0353	0.0531	0.0787	0.0666	0.0298	0.1074
Observations	796902	161292	287816	431686	472710	382239	721348	353415	80807

Country market return									
	Portfolio Equity Flow			Volatility			Market Turnover		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
CWΔ	0.0313***	-0.0219	-0.0171	0.0117	0.0061	0.0139	0.0146*	0.0264**	-0.0742***
	(3.97)	(-1.52)	(-1.27)	(1.41)	(0.62)	(1.27)	(1.75)	(2.38)	(-3.90)
Fund FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.6393	0.5295	0.7329	0.6595	0.6310	0.6928	0.6725	0.6418	0.5483
Observations	796902	161292	287816	431686	472710	382239	721348	353415	80807

Table 9: Country Rotation and Fund Performance, Fund-Country-level Analysis, Skilled Managers

This table presents the effects of country rotation on fund performance at the fund-country level. We run the regressions: $R_{i,c,t} = \alpha + \beta * \mathrm{CW}\Delta_{i,c\,t-1} + \varepsilon_{i,c,t}$, where $R_{i,c,t}$ is the monthly returns of fund *i*'s equity holdings in country *c* during month *t* and $\mathrm{CW}\Delta_{i,c,t-1}$ is fund *i*'s portfolio weight change in country *c* in the quarter prior to month *t*. Skilled managers are the managers showing good performance in their active U.S. domestic equity funds. For each manager-quarter, we first calculate their average fund benchmark adjusted returns in the following three months among their active U.S. domestic equity funds. We then form a group of the manager-quarters with the top 25% average fund benchmark adjusted returns. Skilled managers are the top 25% managers with the highest fraction of quarters in that group relative to the total number of quarters. We classify funds into the ones with and without skilled managers. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	With Skilled Managers			No Skilled Managers		
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return	Fund country holding return – country market return	Country market return
CWΔ	0.0569***	0.0193	0.0393***	0.0176	-0.0036	0.0207***
	(3.02)	(1.34)	(3.96)	(1.46)	(-0.46)	(2.72)
Fund FE	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.3756	0.0471	0.5996	0.3739	0.0450	0.6281
Observations	223776	223776	223776	1083684	1083684	1083684

Table 10: Country Rotation and Fund Flows

This table presents the estimates of monthly fund flows regressed on country rotation. The dependent variable is monthly fund flows. Fund return is the cumulative monthly fund net returns in the previous twelve months. Fund size, Fund age, and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. In Panel A, we present the baseline results. In Panel B, a fund is classified as an institutional-oriented (retail-oriented) fund if more than 80% (less than 20%) of fund assets are owned through the institutional share class. Average country rotation in the recent 4 quarters indicates the regressions use the average country rotation in the recent 4 quarters as the variable of interest. Country rotation_annual indicates the regressions use the country rotation_annual as the variable of interest, which compares a fund's country allocation in a quarter to the fund's country allocation twelve months ago. Index fund indicates the regressions use the U.S. international equity index funds. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Baseline results

	Time-series	Cross-sectional
Country rotation	0.0206***	0.0297***
	(2.77)	(4.47)
Fund size	-0.0073***	-0.0004**
	(-10.59)	(-2.14)
Fund return	0.1257***	0.1386***
	(25.18)	(26.63)
Fund risk	-0.3502***	-0.3313***
	(-7.25)	(-8.22)
Expense ratio	-1.2035***	-0.6672***
	(-5.99)	(-8.58)
Turnover	-0.0046***	-0.0034***
	(-4.89)	(-5.11)
Fund age	-0.0296***	-0.0149***
	(-15.54)	(-28.31)
No. of managers	-0.0006	-0.0008**
	(-0.98)	(-2.25)
Active share	-0.0125*	-0.0004
	(-1.75)	(-0.15)
Country concentration	0.0075**	0.0064***
	(2.34)	(2.69)
Industry concentration	0.0375***	0.0068
	(3.78)	(1.29)
Constant	0.2441***	0.0568***
	(14.23)	(10.82)
Fund FE	Y	
Month FE	Y	Y
Adjusted R^2	0.1488	0.0879
Observations	53815	53815

Panel B: Additional evidence

Time-series relation

	Retail-oriented	Institutional-oriented	Average country rotation in the recent 4 quarters	Country rotation_annual	Index fund
Country rotation	0.0168**	0.0393**	0.0472***	0.0164***	-0.0149
	(2.15)	(2.10)	(4.19)	(3.52)	(-0.87)
Controls	Y	Y	Y	Y	Y
Fund FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.1723	0.1217	0.1497	0.1363	0.0087
Observations	42336	11479	51876	50756	3135

Cross-sectional relation

	Retail-oriented	Institutional-oriented	Average country rotation in the recent 4 quarters	Country rotation_annual	Index fund
Country rotation	0.0320***	0.0291*	0.0522***	0.0148***	0.0273
	(4.42)	(1.94)	(6.15)	(4.03)	(1.08)
Controls	Y	Y	Y	Y	Y
Fund FE					
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.1024	0.0560	0.0881	0.0781	-0.0020
Observations	42336	11479	51876	50756	3135

Appendix:

Variable Definitions

Variable	Definition
No. of funds	The number of funds
Fund size	The total net assets of a fund in million dollars
No. of countries	The number of countries in which a fund invests
Country rotation	$\frac{1}{2}\sum_{c=1}^{C}\left\|w_{c,t} - w_{c,t-1}\right\|$, where $w_{c,t}$ is the percentage of total assets a fund allocates to country *c* at the end of quarter *t*
Fund return	The monthly net of fee fund return
Fund risk	The standard deviation of the monthly net of fee fund returns in the previous 12 months
Fund benchmark adjusted return	The monthly net of fee fund return plus expense ratio minus category benchmark return
Fund flow	The net inflow into a fund in a month
Expense ratio	The annual expense ratio
Turnover	The annual turnover ratio
Fund age	A fund's age in years since its inception
No. of managers	The number of managers in a fund
Active share	$\frac{1}{2}\sum_{i=1}^{I}\left\|w_{i,t} - w_{benchmark,i,t}\right\|$, where $w_{i,t}$ is the portfolio weight of stock *i* at the end of quarter *t* and $w_{benchmark,i,t}$ is the portfolio weight of stock *i* by the benchmark of a fund at the end of quarter *t*
Industry concentration	$\sum_{j=1}^{10}(w_{j,t} - w_{world,j,t})^2$, where $w_{j,t}$ is the weight of the fund holdings in industry *j* at the end of quarter *t* and $w_{world,j,t}$ is the weight of the world stock market in industry *j* at the end of quarter *t*
Country concentration	$\frac{1}{2}\sum_{c=1}^{C}\left\|w_{c,t} - w_{benchmark,c,t}\right\|$, where $w_{c,t}$ is the percentage of total assets a fund allocates to country *c* at the end of quarter *t* and $w_{benchmark,c,t}$ is the percentage of total assets allocated to country *c* by the benchmark of a fund at the end of quarter *t*
Institutional share weight	The percentage of fund total net assets owned through institutional share class
No. of funds in a category	The number of funds in a Morningstar category
World market return	The annual returns of the MSCI World Index
VIX	The average daily VIX index
World GDP growth rate	The growth rate of world GDP
Dollar factor	The monthly average change in the exchange rate between the U.S. dollar and all other currencies
Carry factor	The monthly change in exchange rates between baskets of high and low interest rate currencies
AvgCountry rotation	The average country rotation of all other funds in the same Morningstar category
Portfolio equity inflow	The cross-border capital inflows to equity securities in a country in $trillion
Volatility	The cross-sectional standard deviation of individual stock monthly returns for all stocks in a country
Country market turnover	The value of domestic shares traded divided by their market capitalization
Recession	Indicating whether a country in a month is in the recessionary period classified by ECRI and NBER.

Table A1: Country Rotation and Fund Performance, Global Risk Factors

This table presents the effects of country rotation on fund performance. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. We include the same control variables as in Table 3. For brevity, we do not report the coefficients on control variables. We add Fama-French developed market and emerging market factors, and dollar and carry factors as additional controls. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Developed market factors

	Time-series		Cross-sectional	
Country rotation	0.0059***	0.0038	0.0054**	0.0040
	(2.61)	(1.41)	(2.24)	(1.43)
Country rotation * MKTRF		0.2830***		0.2848***
		(3.88)		(3.93)
Country rotation * SMB		0.4898***		0.5010***
		(3.33)		(3.40)
Country rotation * HML		-0.0453		0.0305
		(-0.26)		(0.18)
Country rotation * MOM		0.4733***		0.4813***
		(6.41)		(6.37)
Country rotation * RMW		0.1239		0.1666
		(0.47)		(0.62)
Country rotation * CMA		-1.4424***		-1.4552***
		(-6.34)		(-6.22)
MKTRF	-0.0029	-0.0272***	-0.0027	-0.0271***
	(-0.32)	(-2.88)	(-0.30)	(-2.83)
SMB	0.1375***	0.0942***	0.1379***	0.0935***
	(6.57)	(4.23)	(6.57)	(4.18)
HML	-0.0540**	-0.0536**	-0.0536**	-0.0599**
	(-2.45)	(-2.18)	(-2.41)	(-2.42)
MOM	0.0381***	-0.0062	0.0372***	-0.0077
	(2.75)	(-0.42)	(2.68)	(-0.52)
RMW	-0.0306	-0.0368	-0.0312	-0.0412
	(-0.97)	(-1.10)	(-0.99)	(-1.21)
CMA	-0.0493	0.0839**	-0.0522	0.0827**
	(-1.51)	(2.33)	(-1.59)	(2.27)
Controls	Y	Y	Y	Y
Fund FE	Y	Y		
Year FE	Y	Y	Y	Y
Adjusted R^2	0.0564	0.0718	0.0493	0.0647
Observations	51704	51704	51704	51704

Emerging market factors

	Time-series		Cross-sectional	
Country rotation	0.0063***	0.0044	0.0059**	0.0044
	(2.68)	(1.55)	(2.36)	(1.55)
Country rotation * MKTRF		0.4679***		0.4639***
		(6.46)		(6.44)
Country rotation * SMB		0.0052		0.0088
		(0.04)		(0.06)
Country rotation * HML		-0.7143***		-0.7182***
		(-3.61)		(-3.62)
Country rotation * MOM		0.3906***		0.3827***
		(4.19)		(4.13)
Country rotation * RMW		-0.2337		-0.2398
		(-0.96)		(-1.00)
Country rotation * CMA		0.2677		0.2261
		(1.00)		(0.85)
MKTRF	0.0280***	-0.0143	0.0284***	-0.0136
	(3.50)	(-1.63)	(3.59)	(-1.55)
SMB	0.0319*	0.0325*	0.0308*	0.0311*
	(1.83)	(1.76)	(1.76)	(1.67)
HML	-0.1002***	-0.0354	-0.1043***	-0.0389
	(-4.22)	(-1.42)	(-4.37)	(-1.56)
MOM	0.0312*	-0.0020	0.0301*	-0.0024
	(1.96)	(-0.13)	(1.89)	(-0.15)
RMW	-0.0117	0.0054	-0.0141	0.0034
	(-0.38)	(0.17)	(-0.46)	(0.11)
CMA	0.0309	0.0061	0.0309	0.0099
	(1.09)	(0.20)	(1.09)	(0.32)
Controls	Y	Y	Y	Y
Fund FE	Y	Y		
Year FE	Y	Y	Y	Y
Adjusted R^2	0.0319	0.0410	0.0251	0.0344
Observations	51641	51641	51641	51641

Dollar and carry factors

	Time-series		Cross-sectional	
Country rotation	0.0064***	0.0030	0.0061**	0.0027
	(2.71)	(1.19)	(2.42)	(1.03)
Country rotation * Dollar		0.1349		0.1376
		(0.86)		(0.88)
Country rotation * Carry		0.7130***		0.7166***
		(5.91)		(5.91)
Dollar	-0.0050	-0.0151	-0.0048	-0.0152
	(-0.24)	(-0.68)	(-0.23)	(-0.67)
Carry	-0.0073	-0.0700***	-0.0070	-0.0700***
	(-0.48)	(-4.02)	(-0.46)	(-3.98)
Controls	Y	Y	Y	Y
Fund FE	Y	Y		
Year FE	Y	Y	Y	Y
Adjusted R^2	0.0202	0.0238	0.0132	0.0169
Observations	51704	51704	51704	51704

Table A2: Country rotation and Fund Performance, Fama-Macbeth Regression

This table estimates the effects of country rotation on fund performance based on Fama-Macbeth regressions. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. Fund size, Fund age and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. T-statistics are based on Newey-west standard errors lags of order 6. *, **, ***, corresponds to significance to the 10%, 5%, and 1% levels, respectively.

Country rotation	0.0060	0.0164**
	(1.07)	(2.18)
Fund size		0.000u3
		(0.90)
Fund risk		0.0114
		(0.18)
Expense ratio		-0.0522
		(-0.45)
Turnover		0.0025*
		(1.81)
Fund age		-0.0021**
		(-2.17)
No. of managers		0.0003
		(0.37)
Active share		-0.0003
		(-0.06)
Country concentration		-0.0048
		(-0.67)
Industry concentration		0.0094
		(0.96)
Constant	0.0011*	-0.0012
	(1.76)	(-0.10)
No. of Month	288	288
R^2	0.0409	0.4398
Observations	63258	51704

Table A3: Country Rotation and Sharpe Ratio

This table presents the effects of country rotation on Sharpe ratio. Sharpe ratio is the ratio of average fund excess return to the standard deviation of fund excess returns in the following 12 months after we measure country rotation. Fund excess return is fund raw return in excess of one-month Treasury yield. Fund size, Fund age and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series	Cross-sectional
Country rotation	0.0269*	0.0313**
	(1.82)	(2.07)
Fund size	-0.0311***	0.0027***
	(-26.43)	(6.24)
Fund risk	-0.4919***	-1.3284***
	(-2.90)	(-9.43)
Expense ratio	0.8984**	0.4572***
	(2.30)	(2.94)
Turnover	-0.0032	-0.0041***
	(-1.60)	(-2.61)
Fund age	0.0279***	-0.0075***
	(5.78)	(-7.83)
No. of managers	0.0022	0.0009
	(1.42)	(1.07)
Active share	0.0657***	0.1247***
	(3.42)	(8.91)
Country concentration	-0.0148	-0.0370***
	(-1.17)	(-3.84)
Industry concentration	0.0408	0.2713***
	(-1.17)	(-3.84)
Constant	0.7284***	0.1350***
	(22.56)	(8.37)
Fund FE	Y	
Month FE	Y	Y
Adjusted R^2	0.9162	0.8979
Observations	44516	44516

Table A4: Annual Country Rotation, Turnover, and Fund Performance

This table presents the effects of annual country rotation and turnover on fund performance. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. Annual country rotation is the average of the four quarterly country rotation values in a year. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series			Cross-sectional		
Annual country rotation	0.0090***		0.0085***	0.0044**		0.0043*
	(3.64)		(2.71)	(2.15)		(1.85)
Turnover		0.0008**	0.0005		0.0004	0.0002
		(2.57)	(1.62)		(1.34)	(0.71)
Constant	0.0005*	0.0008***	0.0002	0.0009***	0.0012***	0.0008***
	(1.66)	(2.86)	(0.64)	(3.40)	(4.40)	(2.76)
Fund FE	Y	Y	Y			
Month FE	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.1703	0.1892	0.1683	0.1623	0.1831	0.1616
Observations	56271	57217	48288	56271	57217	48288

Table A5: Excess Country Rotation and Fund Performance

This table presents the effects of excess country rotation on fund performance. The dependent variable is fund monthly net return plus expense ratio minus category benchmark return. $Excess\ c\text{ountry rotation} = \frac{1}{2}\sum_{c=1}^{C}\left|(w_{c,t} - w_{c,t-1}) - (w_{index\ fund,c,t} - w_{inidex\ fund,c,t-1})\right|$, where $w_{c,t}$ is the percentage of total assets that a fund allocates to country *c* at the end of quarter *t*, $w_{index\ fund,c,t}$ is the percentage of total assets that index funds in the same Morningstar category allocate to country *c* at the end of quarter *t*. Fund size, Fund age and No. of managers are taken the natural logarithm. Variable definitions are in the Appendix. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series		Cross-sectional	
Excess country rotation	0.0067***	0.0052**	0.0054***	0.0057**
	(3.38)	(2.21)	(2.77)	(2.54)
Fund size		-0.0017***		0.0001**
		(-9.94)		(2.48)
Fund risk		-0.0083		0.0240
		(-0.20)		(0.63)
Expense ratio		-0.0592		0.0536**
		(-1.12)		(2.24)
Turnover		0.0002		-0.0001
		(0.78)		(-0.61)
Fund age		0.0008		-0.0002
		(1.31)		(-1.53)
No. of managers		0.0005*		-0.0000
		(1.86)		(-0.25)
Active share		0.0042		0.0027*
		(1.47)		(1.78)
Country concentration		-0.0013		-0.0011
		(-0.63)		(-0.97)
Industry concentration		0.0172*		0.0099**
		(1.90)		(2.48)
Constant	0.0005*	0.0284***	0.0007**	-0.0058**
	(1.79)	(6.90)	(2.29)	(-2.01)
Fund FE	Y	Y		
Month FE	Y	Y	Y	Y
Adjusted R^2	0.1563	0.1554	0.1489	0.1464
Observations	61545	50279	61545	50279

Table A6: Country Rotation and Fund Performance, Fund-Country-level Analysis

This table presents the effects of country rotation on fund performance at the fund-country level. We run the regression : $R_{i,c,t} = \alpha + \beta_1 * \mathrm{CW}\Delta_{i,c\,t-1} + \beta_3 * \mathrm{CW}\Delta_{i,c\,t-1} * \mathrm{CW}\Delta_{index\,,c\,t-1} + \beta_3 * \mathrm{CW}\Delta_{index\,,c\,t-1} + \varepsilon_{i,c,t}$, where $R_{i,c,t}$ is the monthly returns of fund *i*'s equity holdings in country *c* during month *t*, $\mathrm{CW}\Delta_{i,c,t-1}$ is fund *i*'s portfolio weight change in country *c* in the quarter prior to month *t*, and $\mathrm{CW}\Delta_{index\,,c\,t-1}$ represents the country weight change in country *c* in the quarter prior to month *t* by index funds in the same category. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

Time-series					
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0267**	0.0058	0.0208***	0.0261**	0.0256**
	(2.49)	(0.79)	(3.18)	(2.42)	(2.36)
CWΔ*CWΔ_index	0.0386	-0.4031	0.4601	0.3306	-0.0389
	(0.05)	(-1.07)	(0.85)	(0.46)	(-0.05)
CWΔ_index	-0.0344	-0.0695***	0.0338	-0.0278	-0.0287
	(-0.91)	(-3.71)	(1.07)	(-0.79)	(-0.79)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3739	0.0451	0.6229	0.0264	0.0349
Observations	1307460	1307460	1307460	1307460	1307460

Cross-sectional					
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0270**	0.0055	0.0214***	0.0263**	0.0259**
	(2.49)	(0.75)	(3.21)	(2.42)	(2.36)
CWΔ*CWΔ_index	-0.8194	-0.6359*	-0.1720	-0.5006	-0.8973
	(-1.01)	(-1.65)	(-0.29)	(-0.63)	(-1.11)
CWΔ_index	-0.0208	-0.0711***	0.0484	-0.0148	-0.0150
	(-0.55)	(-3.81)	(1.54)	(-0.43)	(-0.42)
Fund FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3729	0.0445	0.6210	0.0249	0.0334
Observations	1307460	1307460	1307460	1307460	1307460

Table A7: Country Rotation and Fund Performance, Fund-Country-level Analysis
Average Country Weight Changes

This table presents the effects of country rotation on fund performance at the fund-country level. We run the regressions: $R_{i,c,t} = \alpha + \beta * \text{AvgCW}\Delta_{i,c\,t-1} + \varepsilon_{i,c,t}$, where $R_{i,c,t}$ is the monthly returns of fund i's equity holdings in country c during month t and $Avg\text{CW}\Delta_{i,c\,t-1}$ is the average country weight change in country c in the quarter prior to month t by all other funds in the same category. Fund country holding return is the monthly return of a fund's equity holdings in a country. Country market return is a country's monthly stock market return. Fund return is fund monthly net return plus expense ratio. Benchmark return is the monthly returns of category benchmark index. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series				
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
AvgCWΔ	0.0980	-0.0975***	0.1887***	0.0997	0.0950
	(1.32)	(-2.77)	(3.06)	(1.35)	(1.28)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3796	0.0456	0.6304	0.0267	0.0346
Observations	1285838	1285838	1285838	1285838	1285838

	Time-series				
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0159**	0.0089	0.0073***	0.0152**	0.0156**
	(2.17)	(1.39)	(2.97)	(2.08)	(2.12)
AvgCWΔ	0.0863	-0.1040***	0.1833***	0.0886	0.0836
	(1.21)	(-3.08)	(3.04)	(1.25)	(1.18)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3796	0.0456	0.6304	0.0267	0.0346
Observations	1285838	1285838	1285838	1285838	1285838

	Cross-sectional				
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
AvgCWΔ	0.1050	-0.0981***	0.1972***	0.1063	0.1020
	(1.40)	(-2.77)	(3.17)	(1.43)	(1.37)
Fund FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3787	0.0451	0.6285	0.0253	0.0333
Observations	1285838	1285838	1285838	1285838	1285838

	Cross-sectional				
	Fund country holding return	Fund country holding return – country market return	Country market return	Fund country holding return – fund return	Fund country holding return – benchmark return
CWΔ	0.0175**	0.0087	0.0090***	0.0168**	0.0172**
	(2.41)	(1.35)	(3.57)	(2.32)	(2.37)
AvgCWΔ	0.0921	-0.1045***	0.1905***	0.0941	0.0894
	(1.28)	(-3.06)	(3.14)	(1.32)	(1.25)
Fund FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Adjusted R^2	0.3788	0.0451	0.6285	0.0253	0.0333
Observations	1285838	1285838	1285838	1285838	1285838

Table A8: Country Weight Change and Country-level Opportunities, Skilled Managers

We present the estimates of country weight change regressed on country-level variables. We run the regressions: $CW\Delta_{i,c\,t} = \alpha + \beta * X_{i,c\,t} + \varepsilon_{i,c,t}$, where $CW\Delta_{i,c\,t}$ is fund i's country weight change in country c during quarter t and $X_{i,c\,t}$ represents country-level variables during quarter t. Skilled managers are the managers showing good performance in their active U.S. domestic equity funds. For each manager-quarter, we first calculate their average fund benchmark adjusted returns in the following three months among their active U.S. domestic equity funds. We then form a group of the manager-quarters with the top 25% average fund benchmark adjusted returns. Skilled managers are the top 25% managers with the highest fraction of quarters in that group relative to the total number of quarters. We classify funds into the ones with and without skilled managers. Country-level variables include volatility, country market turnover, and portfolio equity inflow. Fixed effects are included where indicated. The standard errors are clustered by category × country × quarter. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	With Skilled Managers	No Skilled Managers
Volatility	0.0147***	0.0153***
	(7.09)	(10.33)
Country market turnover	-0.0002	-0.0002
	(-1.12)	(-1.63)
Portfolio equity inflow	0.0076***	0.0071***
	(2.81)	(3.19)
Fund FE	Y	Y
Country FE	Y	Y
Quarter FE	Y	Y
Adjusted R^2	0.0055	0.0046
Observations	75868	398261

Table A9: Country Rotation and Fund Flows, Active Regional Funds

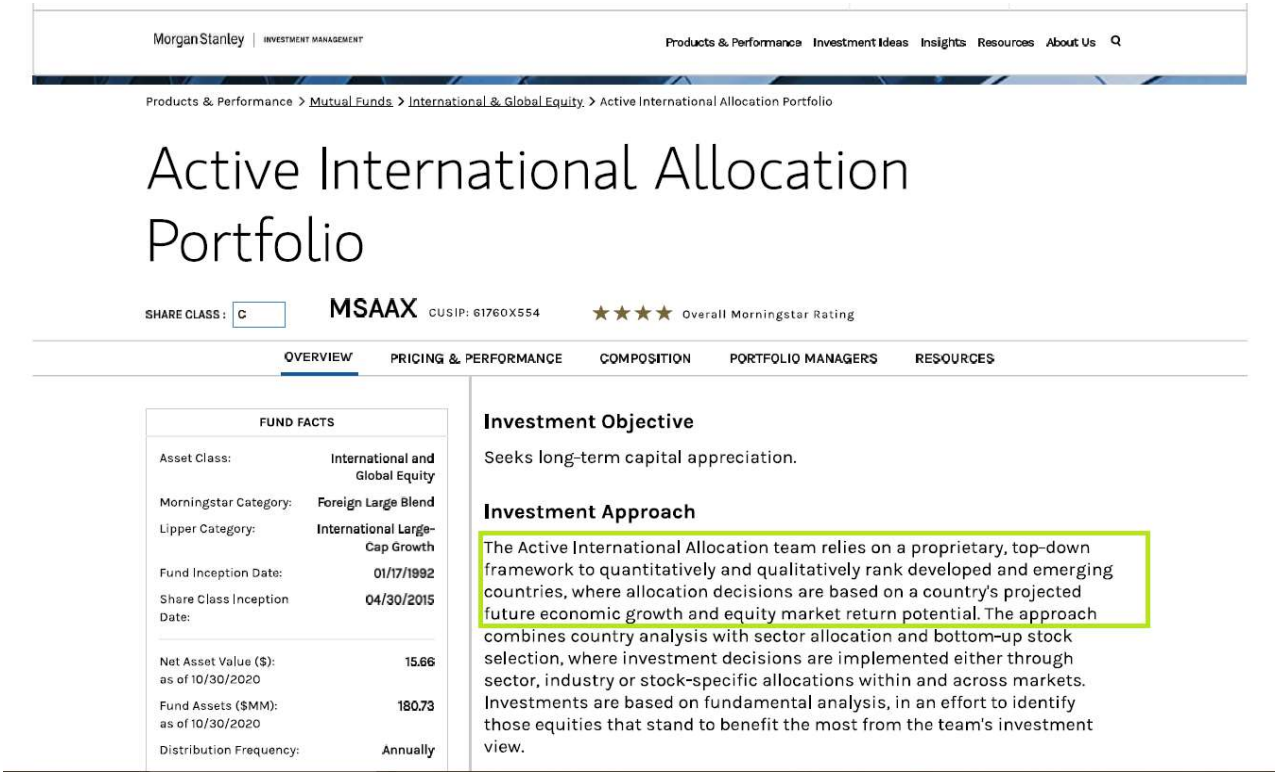
This table presents the estimates of monthly fund flows regressed on country rotation. We estimate based on the sample of active U.S. international equity funds with regional investment mandates from 1991 to 2014. Variable definitions are in the Appendix. Fixed effects are included where indicated. T-statistics are reported in parentheses. The standard errors are clustered by category × month. *, **, ***, represent significance at the 10%, 5%, and 1% levels, respectively.

	Time-series	Cross-sectional
Country rotation	0.0228*	0.0301**
	(1.69)	(2.56)
Fund size	-0.0085***	0.0009**
	(-8.05)	(2.36)
Fund return	0.0793***	0.0786***
	(13.19)	(13.59)
Fund risk	-0.1283**	-0.1388***
	(-2.33)	(-3.18)
Expense ratio	-1.4128***	-0.6444***
	(-3.83)	(-4.60)
Turnover	-0.0054***	-0.0025**
	(-3.26)	(-2.19)
Fund age	-0.0338***	-0.0182***
	(-7.36)	(-18.82)
No. of managers	0.0046***	0.0018***
	(3.34)	(2.58)
Active share	0.0142	0.0315***
	(1.44)	(6.31)
Country concentration	-0.0007	-0.0156***
	(-0.09)	(-3.79)
Industry concentration	0.0762***	0.0024
	(3.23)	(0.18)
Constant	0.2516***	0.0182**
	(10.19)	(1.99)
Fund FE	Y	
Month FE	Y	Y
Adjusted R^2	0.1659	0.1062
Observations	21711	21711

Figure A1

Screenshots of examples of active U.S. international equity mutual funds

The description of fund investment approach

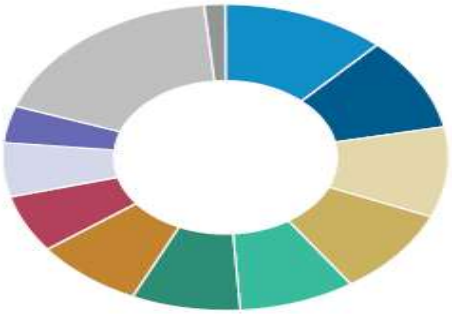


Country allocation shown on fund webpage

Geography

As of 09/30/2020

Top Countries
(% of Total Net Assets)



	FUND	MSCI ACWI
U.S.	11.88	--
France	9.93	6.81
Japan	9.55	16.48
Singapore	9.16	0.67
Germany	8.44	6.15
United Kingdom	7.91	8.49
China	7.90	12.46
Netherlands	6.09	2.78
Canada	5.69	6.47
South Korea	3.89	3.59
Other	18.02	--
Cash	1.55	--

May not sum to 100% due to rounding.

Fund SEC filings

Morgan Stanley Institutional Fund, Inc.
Semi-Annual Report — June 30, 2020 (unaudited)

Portfolio of Investments

Active International Allocation Portfolio

	Shares	Value (000)
Common Stocks (97.3%)		
Argentina (0.1%)		
Despegar.com Corp. (a)(b)	28,000	$ 201
Belgium (1.0%)		
Anheuser-Busch InBev SA N.V.	35,512	1,751
Brazil (2.4%)		
Ambev SA ADR (b)	1,191,706	3,146
Petroleo Brasileiro SA (Preference)	230,481	913
		4,059
Canada (4.5%)		
Agnico Eagle Mines Ltd.	39,382	2,522
Altus Group Ltd. (b)	15,498	465
First Quantum Minerals Ltd.	525,944	4,192
Gildan Activewear, Inc.	34,390	533
		7,712
China (6.2%)		
Alibaba Group Holding Ltd. ADR (a)	14,974	3,230
China Resources Beer Holdings Co., Ltd. (c)	122,000	681
Tencent Holdings Ltd. (c)	57,100	3,659
Tencent Music Entertainment Group ADR (a)	106,800	1,437
Trip.com Group Ltd. ADR (a)	58,933	1,528
Duerr AG	34,808	$ 909
Infineon Technologies AG	47,928	1,123
Jungheinrich AG (Preference)	31,250	735
KION Group AG	13,916	857
Linde PLC (a)	5,356	1,134
SAP SE	23,453	3,278
Siemens Healthineers AG	39,100	1,879
		16,176
India (1.9%)		
Apollo Hospitals Enterprise Ltd.	45,661	817
ICICI Bank Ltd.	129,188	602
ICICI Prudential Life Insurance Co., Ltd.	144,760	819
Maruti Suzuki India Ltd.	12,004	929
		3,167
Ireland (0.3%)		
Kerry Group PLC, Class A	4,867	605
Japan (9.7%)		
FANUC Corp.	5,150	923
Hoya Corp.	7,800	747
Keyence Corp.	5,600	2,347
Murata Manufacturing Co., Ltd.	8,700	513

A fund emphasizing regional rotation strategy

Janus Henderson
INVESTORS

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HFQIX

Global Equity Income Fund

A high-conviction strategy that targets high, dependable income from high-yielding, high-quality global equities

Share Class - I

Quicklinks

Fact Sheet
Profile
Commentary

NAV	1-Day Change	YTD Return	Morningstar Rating
$6.48	▲ $0.12 (1.89%)	▼ -2.06%	★★★★★
As of 11/16/2020	As of 11/16/2020	As of 11/16/2020	As of 10/31/2020

Overview | Performance | Portfolio | Documents | Insights

OVERVIEW

Global Dividend Update

Watch Portfolio Manager Ben Lofthouse provide a market update.

ABOUT THIS FUND

A long-only portfolio that seeks a high level of current income and steady capital appreciation. The Fund seeks global, high-quality, income-producing equities with a focus on international companies.

WHY INVEST IN THIS FUND

Income, Regardless of Environment

With our global approach, we seek to take advantage of various market environments to find the best income-producing equities. We tend to focus on international equities where the income-generating potential may be greater.

Regional Rotation Strategy

We use a specialized rotation strategy intended to capitalize on the global seasonality of dividends.

Differentiated Income Option

The Fund may be an attractive alternative to preferred stock and fixed income. The Fund holds 100% equities with no leverage and a quarterly dividend distribution schedule.

YIELDS (%)

Distribution Yield At NAV (As of 09/30/2020)	8.39%
30-Day SEC Yield - With Waivers (As of 10/31/2020)	3.42%
30-Day SEC Yield - Without Waivers (As of 10/31/2020)	3.42%
Distribution Frequency	Quarterly

FUND DETAILS

Inception Date	Nov 30, 2006
Total Net Assets (As of 10/31/2020)	$3.90B
Gross Annual Expense Ratio (As of fiscal year end 09/30/2019)	0.79%
Net Annual Expense Ratio (As of fiscal year end 09/30/2019)	0.79%

MORNINGSTAR DATA

(As of 10/31/2020)

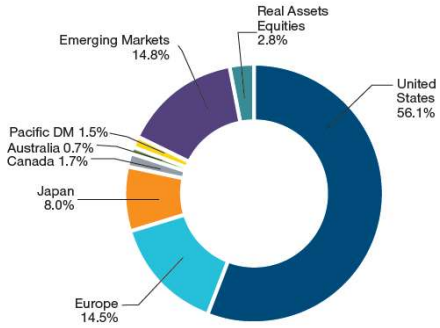
Overall Rating (Based on	★★★★★ 312 Funds Rated

Investment outlooks published by T. Rowe Price

	Positives	Negatives
United States	▪ Vaccinations widely distributed ▪ Infrastructure spending bill likely to be passed ▪ Healthy consumer balance sheets and high savings rate ▪ Strong earnings expectations	▪ Elevated stock and bond valuations ▪ High corporate and government debt levels ▪ Fed dovishness has peaked ▪ Corporate taxes likely to rise
Europe	▪ Higher exposure to more cyclically oriented sectors that should benefit from economic recovery ▪ Vaccination rates improving rapidly ▪ Monetary and fiscal policy remain accommodative ▪ Equity valuations remain attractive relative to the US	▪ Limited long-term catalysts for growth ▪ Limited scope for European Central Bank to stimulate further ▪ Brexit likely to negatively impact trade ▪ Demand from China fading ▪ Microchip shortage impacting manufacturing
Developed Asia/Pacific	▪ Cyclical orientation should benefit from economic rebound ▪ Strong fiscal and monetary support ▪ Improving corporate governance	▪ Vaccination effort has been slower than other developed markets ▪ Weak economic growth going into crisis, driven by long term demographic headwind ▪ Limited long-term catalysts for growth
Emerging Markets	▪ Exposure to cyclical areas of economy should benefit from broad global recovery ▪ Commodity prices are elevated ▪ Equity valuations attractive relative to developed markets	▪ Vaccine supply and distribution infrastructure are well behind developed markets (excluding China) ▪ Stimulus from China is fading ▪ Accommodation from central banks is fading ▪ Limited ability to enact fiscal stimulus (excluding China)

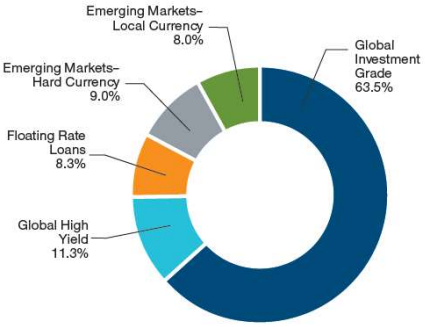
Equity	Neutral Weight	Tactical Weight	Relative Weight
United States	54.7%	56.1%	+1.4%
Europe	15.9	14.5	-1.5
Japan	6.3	8.0	+1.7
Canada	2.7	1.7	-1.0
Australia	1.7	0.7	-1.0
Pacific – Developed Markets (DM)	1.2	1.5	+0.3
Emerging Markets	12.4	14.8	+2.4
Real Assets Equities	5.0	2.8	-2.3
Total Equity:	100.0%	100.0%	

Tactical Allocation Weights



Fixed Income	Neutral Weight	Tactical Weight	Relative Weight
Global Investment Grade (Hedged)	70.0%	63.5%	-6.5%
Global High Yield	10.0	11.3	+1.3
Floating Rate Loans	5.0	8.3	+3.3
Emerging Markets – Hard Currency	9.0	9.0	0.0
Emerging Markets – Local Currency	6.0	8.0	+2.0
Total Fixed Income:	100.0%	100.0%	

Tactical Allocation Weights



Source: T. Rowe Price.

Neutral equity portfolio weights broadly representative of MSCI All Country World Index regional weights; includes allocation to real assets equities. Core global fixed Income allocation broadly representative of Bloomberg Barclays Global Aggregate Index regional weights.

Information presented herein is hypothetical in nature and is shown for illustrative, informational purposes only. It is not intended to be investment advice or a recommendation to take any particular investment action. This material is not intended to forecast or predict future events and does not guarantee future results. These are subject to change without further notice.

Source for Bloomberg Barclays index data: Bloomberg Index Services Limited. See additional disclosures on final page for more information.

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