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Country Rotation and International Mutual Fund Performance

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Abstract

International equity funds attain superior subsequent performance by actively changing their country asset allocations, which we capture through a new measure of active country rotation intensity. Across funds, those that rotate country allocations with the greatest intensity on average have the highest value added. We offer evidence that a fund's change of holdings in a country is associated with future outperformance in those specific holdings. Outperformance is concentrated on the downside when funds sell down country holdings before subsequent poor country market returns. Overall, our findings affirm that active international mutual funds have country market timing abilities.

I. Introduction

Much research and market wisdom affirm that investors who seek international diversification and long-run capital appreciation in foreign markets should invest in low-cost, passive international funds.[1] However, according to the Investment Company Fact Book (2022), over 80% of the U.S.-based $3.5 trillion international equity fund asset market in 2021 is actively managed, a much higher fraction than the 64% of U.S.-based domestic equity fund assets. Existing research on active international equity funds highlights the benefits of funds concentrating

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[1]The theoretical and empirical underpinnings for international portfolio choice lie with Solnik (1974), Adler and Dumas (1983), Errunza and Losq (1989), French and Poterba (1991), Bohn and Tesar (1996), De Santis and Gerard (1997), Stulz (1999), Errunza, Hogan, and Hung (1999), Dahlquist and Harvey (2001), Karolyi and Stulz (2003), Glassman and Riddick (2006), among many others.

on specific countries. Information-based theories of home bias (among others, van Nieuwerburgh and Veldkamp (2009)) suggest that investors should focus on building their informational advantages on a few countries instead of rotating across many countries. Empirical research in support of these theories has found that portfolio concentration of asset holdings in a few countries or industries leads to superior investment performance (among others, Kacperczyk, Sialm, and Zheng (2005), Choi, Fedenia, Skiba, and Sokolyk (2017), Schumacher (2018), and Jagannathan, Jiao, and Karolyi (2022)).

Instead of focusing on a fund's concentration in certain countries at a given point in time, our article examines a different strategy of "country rotation intensity," which has received little attention in the literature. This is an investment strategy that involves reallocating assets among various countries—rotating in and out of countries as time passes—to capitalize tactically on the performance of different national markets during different phases of the global economic and financial cycles. In this study, we empirically test whether international equity funds can attain superior investment performance by actively changing, or "rotating," their country asset allocations.

There is mixed evidence on whether funds possess market timing skills in domestic markets, particularly in the U.S.[2] We contribute to the literature on fund managers' market timing ability by extending the focus to international markets. Executing a successful country rotation strategy requires funds to monitor and time the market returns of many countries, a task far more complex than timing the U.S. market alone. However, Samuelson's dictum suggests that macro markets may exhibit greater inefficiency than micro markets (Samuelson (1998)).[3] If this conjecture holds true, active international funds may be particularly well-positioned to adjust their country allocations to capitalize on time-varying opportunities and inefficiencies in different national markets. Therefore, we propose that examining country rotation strategies can offer new insights into whether funds are capable of timing market returns across a wide range of countries.

If certain international funds are skilled in identifying time-varying investment risks and opportunities in different markets that comprise their investment mandate, we hypothesize that they would move assets from countries with poorer investment prospects to those with better investment prospects and that they would do so at the right time. When funds perceive more dramatic changes in the investment environments in different markets, they would intensify their country allocation rotations. This conjecture implies a positive relation between

[2]As far back as the seminal study by Henriksson and Merton (1981), the question has been of great interest. Becker, Ferson, Myers, and Schill (1999), Goetzmann, Ingersoll, and Ivković (2000), Jiang (2003), and Busse, Ding, Jiang, and Tang (2023) find that fund managers tend not to have market timing ability. Chance and Hemler (2001), Bollen and Busse (2001), Jiang, Yao, and Yu (2007), Chen and Liang (2007), Kacpercyzk, van Nieuwerburgh, and Veldkamp (2014), Bodnaruk, Chokaev and Simonov (2019), Zambrana and Zapatero (2021), and Busse, Ding, Jiang, and Tang (2023), however, document positive market timing ability.

[3]Jung and Shiller (2005) and Xiao, Yan, and Zhang (2022) examine Samuelson's dictum through predictability regressions in the U.S. and global markets. Glasserman and Mamaysky (2023) also find support for Samuelson's dictum. Gârleanu and Pedersen (2022) shows theoretically that inefficiency arises from macro sources when the number of assets becomes large, which is the case for international investing. In their model, investors make money on a large scale mainly through timing or buying the market factors.

the level of country rotation intensity and subsequent fund performance. This is the core test of our study.

We first define and measure a new concept of country rotation intensity. It is the extent to which a fund changes in absolute terms its country allocations between 2 quarters. That is, the higher a fund's country rotation is, the more assets a fund shifts *across countries* between 2 quarters. We seek to understand how much active international funds change their country portfolio weights from quarter to quarter, what the attributes and qualities are of those funds that do so more than others, and whether the funds pursuing more aggressive country rotation strategies are better at navigating the changing environments in different countries.

Our study can be linked to the work of Pástor, Stambaugh, and Taylor (2017), who develop a model on domestic funds exploiting time-varying opportunities through trading intensity. In their model, funds generate higher returns by trading with more intensity when they perceive greater investment opportunities. They document a positive relation between turnover and fund performance for U.S. domestic equity mutual funds. In our article, we examine the effect of overall portfolio turnover and then separately examine the effect of country rotation intensity and within-country stock turnover intensity. In our global setting, we find that country rotation is more important than either the overall portfolio turnover or within-country stock turnover.

We then look deeper into holdings data and examine how country weight changes are associated with fund country holding returns. Our study not only describes the breadth of country rotation skills among funds but also examines whether such skills come from the upside or downside, country market timing, or stock selection. Our article differs from the earlier approach in Choi et al. (2017), which examines the link between country *over- or under-weighting* and subsequent returns. We interpret country weight changes as short-term, tactical market timing decisions, whereas over- and under-weighting reflect long-term asset allocation strategy. Empirically, we find that after accounting for country over- and under-weighting, the *changes* in country weights predict future country holding returns, highlighting the importance of short-term, tactical timing decisions.

International funds in our sample, on average, change their country allocations by 7.1% of their total net assets between 2 quarters with a standard deviation of 5.1%. Consistent with our main conjecture, funds with higher levels of country rotation do have superior subsequent performance. When sorting funds into quintiles based on their country rotation, we find that subsequent portfolio performance increases with the country rotation quintile. Funds in the highest country rotation quintile have an average abnormal return of 2.04% per year. This performance is significantly higher than that of funds in the lowest country rotation quintile, which have an abnormal return of 0.72% per year. Funds that change their country allocations the most also deliver a sizable value added (Berk and van Binsbergen (2015)), with an average annualized value added of $33 million per fund per year. Panel regressions, including a battery of control variables, suggest that a 1-standard-deviation increase in the level of country rotation intensity is associated with an increase in annualized fund abnormal returns of 0.3%.

Country rotation can arise simply from shifts in valuations alone and not necessarily by means of strategic or tactical actions by fund managers. 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. Hence, it is essential to focus on the active version of country rotation in our analysis and not a mechanical form derived from valuation changes. We, therefore, adopt an active version of country rotation intensity throughout the article, calculating country weight changes by adjusting for the valuation effects of individual country holdings relative to the overall portfolio. This country rotation measure better captures the active asset allocation decisions made by fund managers. For robustness, we also examine the impact of country rotation without adjusting for valuation effects, referred to as "unadjusted" country rotation. The positive relation between country rotation and performance remains the same.

To calculate abnormal fund returns, we adjust fund returns relative to their Morningstar benchmarks. This method does not account for the variations in systematic risk exposure when funds change country asset allocations over time. For example, a fund may outperform its benchmark by overweighing countries with higher exposure to systematic market or factor risks. To address this concern, we refine our performance measurement by adjusting for country-specific, time-varying exposure to risk factors. This adjustment is made by calculating fund performance as a weighted alpha of the fund's country equity holdings. We do this by first running rolling-window regressions on each fund's excess returns in a particular country, using the global Fama–French factors for market, size, and value. This provides us with estimates of how sensitive each fund's country-holding returns are to these risk factors over time. Once we have these risk factor sensitivities for each country, we use them to adjust the fund's returns by accounting for the specific risk exposures in each fund's country holdings. This adjustment enables us to measure the fund's performance by isolating the effect of country rotation decisions from broader market and risk factor exposures. The positive relation between country rotation intensity and subsequent fund performance remains significant.

We also directly analyze the stock-picking and market-timing components of fund manager skills. Following the methodology of Kacperczyk, van Nieuwerburgh, and Veldkamp (2014), we construct measures for both stock-picking and market-timing. Our results show that the impact of country rotation on overall fund performance primarily arises from the managers' country market timing abilities rather than stock-picking abilities.

We next advance to a more granular level of analysis based on changes in fund holdings in each country from one quarter to the next. Such portfolio weight changes in each country are the building blocks of our overall country rotation measure for a given fund. We first examine whether fund country weight changes in a country are associated with subsequent fund country holding returns. We find that overall country holding weight changes are associated with outperformance *on these specific holdings.* Interestingly, the positive performance link from country weight changes is asymmetric and comes primarily from avoiding downside losses. Funds are able to reduce portfolio weights in a country before poor performance in their specific holdings in that country. On the upside, funds reveal no such predictive ability. To investigate this asymmetry further, we relate fund country holding performance to three factors: country market returns in local currency, the stock-picking component in local currency, or currency returns vis-à-vis U.S. dollars. We find that

the reduction of funds' portfolio weights in a country is primarily associated with subsequent poor country stock market returns. This suggests that funds can anticipate poor outcomes in the stock markets and reduce their country weights ahead of time. The countries from which funds drive most profits in this downside country market timing are Japan, the U.K., China, Ireland, and Germany.

Market segmentation and volatility across different countries could potentially impact our country rotation results. Funds with larger allocations to more volatile countries could mechanically induce a larger unadjusted country rotation intensity. In a partially segmented world, local market variance is priced and could lead to a higher expected return. High country rotation intensity funds might allocate more assets to more volatile countries and thus generate better performance. To examine this issue, we take two approaches. First, we construct what we call "passive country rotation," which reflects the country rotation purely driven by mechanical valuation effects. After all, a fund with higher exposure to more volatile stocks or markets would mechanically have a larger passive country rotation intensity. If our country rotation results are driven by holdings just in highly volatile markets, we should expect passive country rotation to predict fund returns. Our results show that this is not the case. After controlling for passive country rotation, our active country rotation measure remains reliably associated with subsequent returns.

Second, we investigate whether funds' investments in more segmented markets are driving our results. Bekaert, Harvey, Lundblad, and Siegel (2011) construct a measure of market segmentation across countries and show that highly segmented markets have high political risk, low stock market development, and high market volatility. We create a market segmentation measure for each country in our sample following Bekaert, Harvey, Lundblad, and Siegel (2011). We rerun regressions of fund holding returns on lagged country weight changes separately for countries with high and low segmentation. We find that a fund's country weight changes predict future fund country holding returns in countries with low market segmentation rather than high market segmentation. We also find that a fund's country weight changes predict future returns mainly in developed markets (DMs) and among countries with relatively low volatility. Overall, our findings demonstrate that the key driver of our results is funds actively rotating assets across countries rather than their exposure to volatile or segmented markets.

II. Data and Summary Statistics

We obtain information on U.S. international equity mutual funds from Morningstar. Our sample period is from 1991:Q1 to 2022:Q1. Morningstar reports fund holdings, fund assets, fund returns, and other fund-level characteristics. We focus on active U.S. international equity funds with global investment mandates, which include funds in specific Morningstar categories.[4] We exclude fund-quarter observations with funds later $10 million in total net assets.

[4]These categories include Foreign Large Blend, Foreign Large Growth, Foreign Large Value, Foreign Small/Mid Blend, Foreign Small/Mid Growth, Foreign Small/Mid Value, World Large-Stock Blend, World Large-Stock Growth, World Large-Stock Value, and World Small/Mid Stock.

International stock returns data are from Refinitiv's Datastream International. To alleviate the influence of data errors in the international returns data, we winsorize stock returns at 0.1 and 99.9% in each country. U.S. stock returns data are from the Center for Research on Security Prices (CRSP). All the returns data are denominated in U.S. dollars. 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 Datastream data set.[5] We use the CRSP value-weighted market returns as the U.S. market monthly returns. Exchange rate data are also from Datastream.

Our unadjusted country rotation measure reflects the extent to which a fund's country asset allocations change between 2 quarters. It is defined as follows:

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

where $w_{c,q}$ is the percentage of total net assets that a fund allocates to stocks in country c at the end of quarter q. The higher a fund's country rotation is, the more assets a fund moves across countries between 2 quarters. As an example, at the end of quarter q, the fund allocates 30% of its assets to U.K. stocks and 70% to Chinese stocks, compared to an allocation of 50% to U.K. stocks and 50% to Chinese stocks at the end of quarter $q-1$. Then, the unadjusted country rotation of this fund in quarter q is $\frac{1}{2}(|30\% - 50\%| + |70\% - 50\%|) = 20\%$, which implies that this fund moves 20% of its assets across countries in the quarter.[6] Country rotation ranges from 0 to 100% for long-only mutual funds that do not buy on margin.

For active international equity funds, a nontrivial part of the country weight changes could be simply driven by valuation effects. 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. To focus on the active country allocation changes, we compute our main country rotation measure, controlling for the valuation effects of underlying assets.

$$\text{Country rotation} = \frac{1}{2}\sum_{c=1}^{C}\left|w_{c,q} - \frac{w_{c,q-1}\left(1 + R^{E}_{c,q}\right)}{\left(1 + R_{f,q}\right)}\right|,$$

where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q. The construction of country rotation assumes that funds change equity holdings right at the end of each

[5]To minimize potential biases arising from small and illiquid stocks, we remove those stocks in the bottom 10% of the market capitalization in each country.

[6]Table A2 of the Supplementary Material presents an example of calculating country rotation [unadjusted] for the Morgan Stanley Active International Allocation Fund using the fund's reported country portfolio weights.

quarter. In particular, we also define the country weight change in country c during quarter q as: $w_{c,q} - \frac{w_{c,q-1}\left(1+R^E_{c,q}\right)}{\left(1+R_{f,q}\right)}$. Returning to the same example from previously, suppose the fund allocates 30% of its assets to U.K. stocks and 70% to Chinese stocks at the end of quarter q, compared to 50% in U.K. stocks and 50% in Chinese stocks at the end of quarter q – 1. Assuming the country holding return for the U.K. is 2% and for China is −2% during quarter q, and that the fund adjusts its holdings right at the end of quarter q, the fund's overall return for quarter q would be 0%. The country rotation of this fund in quarter q is $\frac{1}{2}(|30\% - 50\%(1+2\%)| + |70\% - 50\%(1-2\%)|) = 21\%$, which implies that this fund actively moves 21% of its assets across countries in the quarter.

In Table 1, we present summary statistics used in our article. The average country rotation [unadjusted] is 7.7%, implying that, on average, a fund's country allocation changes between 2 quarters is about 7.7% of its total net assets. The average country rotation intensity, which is adjusted for valuation effects, is 7.1%, suggesting a fund actively moves 7.1% of its assets across countries between 2 quarters. Country rotation has a standard deviation of 5.1%.

On average, we have 335 active U.S. international equity funds in our sample in a year. An average fund has approximately $2.3 billion assets under management (AUM) and invests in 22 countries. On average, a fund holds 9 stocks in a country per quarter, and the median is 3 stocks. Country weight change is the variable that measures the change in portfolio weight of one country's holdings during a quarter. The average country weight change is 0.003%, with a standard deviation of 1.05%. Country excess weight is the portfolio weight of one country's holdings in excess of that in global stock markets. The average country excess weight is 0.92%.

To capture a fund's stock turnover between 2 quarters, we compute stock turnover as:

$$\text{Stock turnover} = \frac{1}{2}\sum_{s=1}^{S}\left|w_{s,q} - \frac{w_{s,q-1}\left(1+R^E_{s,q}\right)}{\left(1+R_{f,q}\right)}\right|,$$

where $w_{s,q}$ is the portfolio weight of stock s at the end of quarter q, $R^E_{s,q}$ is stock s's return during quarter q denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q. The average stock turnover is 11.1%, indicating a fund, on average, moves 11.1% of its total net assets across individual stock holdings in a quarter. We also compute the within-country stock turnover between 2 quarters as:

$$\text{Within}-\text{country stock turnover} = \frac{1}{2}\sum_{s=1}^{S}\left|w^*_{s,q} - \frac{w^*_{s,q-1}\left(1+R^E_{s,q}\right)}{\left(1+R^E_{c,q}\right)}\right|,$$

where $w^*_{s,q}$ is the weight of the stock s in its corresponding country portfolio of the fund at the end of quarter q. The average within-country stock turnover is 294% in a quarter, suggesting a fund's within-country stock turnover in all the countries is about 3 times the fund's average assets in a country. Both stock turnover and

TABLE 1

Summary Statistics

Table 1 summarizes the characteristics of active U.S. international equity mutual funds with global investment mandates between 1991:Q1 and 2022:Q1. Country rotation [unadjusted] $= \frac{1}{2}\sum_{c=1}^{C}\left|w_{c,q} - w_{c,q-1}\right|$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q. Country rotation $= \frac{1}{2}\sum_{c=1}^{C}\left|w_{c,q} - \frac{w_{c,q-1}\left(1+R^{E}_{c,q}\right)}{\left(1+R_{f,q}\right)}\right|$, where $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q. No. of funds is the number of funds in a year. Fund size is the total net assets of a fund in $billions. No. of countries is the number of countries in which a fund invests. Stock turnover $= \frac{1}{2}\sum_{s=1}^{S}\left|w_{s,q} - \frac{w_{s,q-1}\left(1+R^{E}_{s,q}\right)}{\left(1+R_{f,q}\right)}\right|$, where $w_{s,q}$ is the portfolio weight of stock s at the end of quarter q and $R^{E}_{s,q}$ is stock s's return during quarter q denominated in U.S. dollars. Within-country stock turnover $= \frac{1}{2}\sum_{s=1}^{S}\left|w^{*}_{s,q} - \frac{w^{*}_{s,q-1}\left(1+R^{E}_{s,q}\right)}{\left(1+R^{E}_{c,q}\right)}\right|$, where $w^{*}_{s,q}$ is the weight of the stock s in its corresponding country portfolio of the fund at the end of quarter q. Country excess weight $= w_{c,q} - w_{world,c,q}$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, and $w_{world,c,q}$ is country c's stock market weight in the global stock market at the end of quarter q. Country weight change $= w_{c,q} - \frac{w_{c,q-1}\left(1+R^{E}_{c,q}\right)}{\left(1+R_{f,q}\right)}$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the corresponding fund's raw return during quarter q. Number of stock holdings per country is the number of stocks held by a fund in a country. Fund benchmark-adjusted raw return is the monthly fund raw return minus Morningstar category benchmark return. Expense ratio is the annual expense ratio. Turnover is the annual turnover ratio as reported by Morningstar. Fund age is a fund's age in years since its inception. Fund risk is the past 12-month fund monthly return volatility. No. of managers is the number of managers in a fund. Active share $= \frac{1}{2}\sum_{s=1}^{S}\left|w_{s,q} - w_{bench,s,q}\right|$, where $w_{s,q}$ is the fund portfolio weight of stock s at the end of quarter q and $w_{bench,s,q}$ is the portfolio weight of stock s in the fund's Morningstar category benchmark index at the end of quarter q. Industry concentration $= \sum_{j=1}^{10}\left(w_{j,q} - w_{world,j,q}\right)^{2}$, where $w_{j,q}$ is the weight of the fund holdings in industry j at the end of quarter q and $w_{world,j,q}$ is the weight of the global stock market in industry j at the end of quarter q. Country concentration $= \frac{1}{2}\sum_{c=1}^{C}\left|w_{c,q} - w_{world,c,q}\right|$, where $w_{c,q}$ is the percentage of total assets a fund allocates to country c at the end of quarter q and $w_{world,c,q}$ is country c's stock market weight in the global stock market at the end of quarter q.

	Mean	Median	SD	Min	Max
Country rotation	7.1%	5.8%	5.1%	0%	32.7%
Country rotation [unadjusted]	7.7%	6.3%	5.3%	0%	34.0%
No. of funds	335	378	206	15	638
Fund size ($billions)	2.3	0.3	8.7	0.01	196.4
No. of countries	22	21	8	1	75
Stock turnover	11.1%	9.3%	7.7%	1.7%	46.2%
Within-country stock turnover	294%	244%	216%	9%	1053%
Country excess weight	0.9%	0.7%	7.1%	−38.0%	18.5%
Country weight change	0.04%	0.00%	1.00%	−3.75%	3.93%
No. of stock holdings per country	9	3	41	1	2113
Fund benchmark-adjusted raw return (monthly)	0.05%	0.03%	1.7%	−21.3%	37.8%
Expense ratio (annual)	1.2%	1.2%	0.4%	0%	5.1%
Turnover (annual, Morningstar)	62%	47%	49%	2%	264%
Fund age	14	12	10	1	47
Fund risk	4.7%	4.3%	2.0%	1.6%	11.3%
No. of managers	3	2	3	1	45
Active share	80%	82%	10%	33%	97%
Industry concentration	4%	3%	5%	0.1%	31%
Country concentration	54%	57%	13%	10%	77%

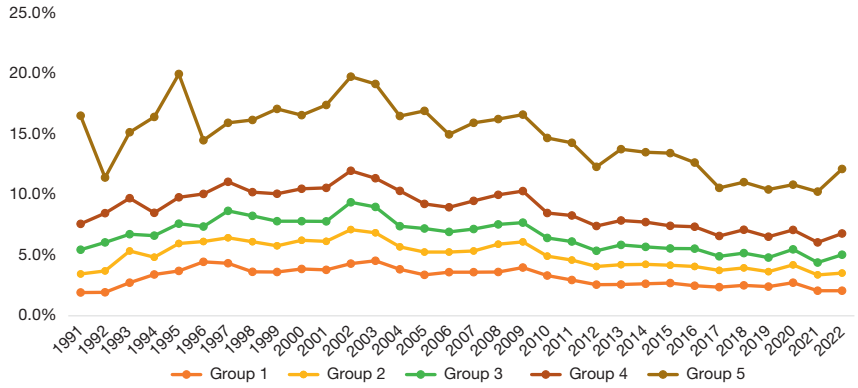
within-country turnover measures are adjusted for valuation effects, assuming funds change equity holdings right at the end of each quarter.

Fund benchmark-adjusted raw returns are fund monthly raw returns minus the monthly returns of the corresponding category benchmark index. Morningstar assigns a distinct benchmark index to each fund category, reflecting the investment focus and strategies of the included holdings. Various categories correspond to specific indices. For instance, the Morgan Stanley Capital International (MSCI) All-Capital World (ACWI) Growth index serves as the benchmark for the World

FIGURE 1

Country Rotation over Time

Figure 1 shows the average level of country rotation over time. Country rotation is computed as $\frac{1}{2}\sum_{c=1}^{C}\left|w_{c,q}-\frac{w_{c,q-1}\left(1+R^{E}_{c,q}\right)}{\left(1+R_{f,q}\right)}\right|$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q. We categorize funds into quintiles based on their average country rotation in a year. We equal- weighted each fund's country rotation in a group. The sample includes active U.S. international equity funds with global investment mandates between 1991:Q1 and 2022:Q1.



Large-Stock Growth category, while the MSCI World Ex. USA Small/Mid Cap (SMID) Value index serves as the benchmark for the Foreign Small/Mid Value category.[7] We obtain the category benchmark index returns data from Refinitiv's Datastream International. The average fund benchmark-adjusted raw return is 0.05% per month. The average annual expense ratio is 1.2%. The annual fund turnover reported by Morningstar is 62%. Funds in our sample have an average fund age of 14 years. Each fund has, on average, 3 portfolio managers in the management team. We also calculate active shares, industry concentration, and country concentration following Cremers and Petajisto (2009), Kacperczyk, Sialm, and Zheng (2005), and Choi et al. (2017).

III. Understanding Country Rotation

Figure 1 presents the average country rotation over time. We categorize funds into five groups based on their average country rotation intensity in a year and plot the average country rotation of these five groups. The group with the highest country rotation exhibits around 15% country rotation over time, as compared to 4% in the group with the lowest country rotation. The group of funds with the highest country rotation also shows substantially higher fluctuations in the level of country rotation intensity over time compared to other groups. This figure indicates considerable heterogeneity in the country rotation intensity levels across different funds.

[7]We provide a full list of the benchmark index of each category in Table A1 of the Supplementary Material.

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We next relate the level of country rotation intensity to fund characteristics in Table 2. In Panel A, we sort funds on country rotation intensity and report fund characteristics for each group. The fund characteristics include fund size, stock turnover, within-country stock turnover, expense ratio, annual turnover ratio reported by Morningstar, fund age, number of managers, active share, industry concentration, and country concentration. In Panel B, we report the correlation matrix based on these variables.

We find that the level of country rotation decreases as fund size increases. Funds with more AUM should incur higher transaction costs when they move assets across countries since markets may be inelastic, as pointed out in Gabaix and Koijen (2021). Smaller funds, however, can move their investments from country to country without a huge price impact. The level of country rotation also increases as stock turnover and within-country stock turnover increase. Country rotation has a very high correlation with stock turnover at 0.8 and a correlation with within-country stock turnover at 0.47. This finding implies that funds with high country rotation may not merely move their assets across countries to follow countries' market portfolios. Instead, they also appear to pick stocks tactically in different markets. We also find high country rotation funds tend to charge high expense ratios. Country rotation is not strongly correlated with fund age, active share, industry concentration, or country concentration.

IV. Country Rotation and the Performance of International Mutual Funds

In this section, we examine our main findings linking country rotation strategies with fund performance. If certain funds can rotate assets across countries to exploit time-varying investment risks and opportunities in different markets, then they should generate better performance after changing country allocations with greater intensity. This is our central hypothesis.

A. Country Rotation: Performance Relationship via Portfolio Sorts

In this subsection, we sort funds into quintiles based on their country rotation and construct a calendar-time portfolio for each group to study the relation between country rotation and subsequent fund performance. Fund performance is reported monthly, but country rotation is measured every quarter. We use the country rotation computed at a prior quarter-end to predict the monthly fund returns for the 3 months after that quarter-end. For example, the country rotation computed on Dec. 31, 2021, would be linked to the 3 fund monthly returns of Jan. 2022, Feb. 2022, and Mar. 2022. In Panel A of Table 3, we find that portfolio performance increases with the country rotation quintile. Funds in the highest country rotation quintile, on average, outperform the Morningstar category benchmark by 0.17% per month (i.e., 2.04% per year). This performance is substantially higher than the average fund benchmark-adjusted raw return, which equals 0.6% per year. It is also significantly higher than that of funds in the lowest country rotation quintile, which have a benchmark-adjusted raw return of 0.06% per month (i.e., 0.72% per year). We observe similar findings when sorting funds based on the unadjusted country

TABLE 2

Country Rotation and Fund Characteristics

Table 2 presents the relations between country rotation and fund characteristics. We sort funds into quintiles based on country rotation in Panel A. We report the mean values of fund characteristics for each group. In Panel B, we report the correlation matrix.

Panel A. Sort on Country Rotation

Country Rotation Group	1 (lowest)	2	3	4	5 (highest)
Fund size	3,799	3,494	2,147	1,205	786
Stock turnover	5.8%	7.9%	9.7%	11.9%	18.3%
Within-country stock turnover	181.9%	236.8%	282.0%	331.0%	431.9%
Expense ratio	1.1%	1.1%	1.2%	1.2%	1.3%
Turnover (annual, Morningstar)	33.3%	44.9%	55.2%	69.5%	101.8%
Fund age	14.36	14.67	14.07	13.32	12.59
Active share	77.2%	78.6%	80.4%	82.0%	83.3%
Industry concentration	4.6%	3.9%	3.8%	3.9%	4.3%
Country concentration	51.5%	52.4%	53.8%	55.0%	55.8%

Panel B. Correlation Matrix

	Country Rotation	Fund Size	Stock Turnover	Within-Country Stock Turnover	Expense Ratio	Turnover	Fund Age	Active Share	Industry Con	Country Con
Country rotation	1.00									
Fund size	−0.11	1.00								
Stock turnover	0.80	−0.11	1.00							
Within-country stock turnover	0.47	−0.01	0.65	1.00						
Expense ratio	0.27	−0.19	0.23	0.15	1.00					
Turnover	0.53	−0.13	0.64	0.55	0.28	1.00				
Fund age	−0.12	0.21	−0.12	−0.08	−0.09	−0.12	1.00			
Active share	0.12	−0.12	−0.04	−0.33	0.20	−0.04	−0.04	1.00		
Industry concentration	−0.01	−0.06	−0.07	−0.25	0.07	−0.10	−0.07	0.39	1.00	
Country concentration	0.10	−0.11	0.02	−0.02	−0.07	−0.02	−0.05	−0.03	−0.03	1.00

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TABLE 3

Country Rotation, Fund Performance, and Value Added

Table 3 presents the relation between country rotation and fund performance. In Panel A, at the end of each quarter, we sort funds into quintiles based on their country rotation or country rotation [unadjusted]. Within each group, we equal-weighted each fund's performance. Fund performance is monthly fund raw return minus Morningstar category benchmark return. Panel B presents the relation between dollar country rotation and value added. Value added is calculated as the monthly fund benchmark-adjusted raw return multiplied by the fund size in the previous month. Following the approach of Berk and van Binsbergen (2015), we calculate the average value added for each fund in the sample and report the cross sectional mean value added for each dollar country rotation group. Dollar country rotation is country rotation multiplied by fund size at the quarter end. We categorize funds into quintiles based on their average dollar country rotation or dollar country rotation [unadjusted]. The definitions of country rotation or country rotation [unadjusted] are in Table 1. *t*-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Country Rotation and Fund Returns

Quintiles	1 (lowest)	2	3	4	5 (highest)	5–1
	Fund benchmark-adjusted return					
Country rotation	0.0006	0.0008**	0.0007*	0.0017***	0.0017***	0.0012**
	(1.28)	(2.03)	(1.72)	(3.57)	(2.77)	(2.10)
Country rotation [unadjusted]	0.0005	0.0008**	0.0008*	0.0016***	0.0019***	0.0014**
	(0.96)	(2.03)	(1.96)	(3.19)	(2.97)	(2.35)

Panel B. Dollar Country Rotation and Value Added

Quintiles	1 (lowest)	2	3	4	5 (highest)	5–1
	Value Added ($million)					
Dollar country rotation	−0.0245**	−0.0697**	−0.1016**	−0.2413*	2.7327***	2.7572***
	(−2.00)	(−2.24)	(−2.38)	(−1.69)	(4.10)	(4.13)
Dollar country rotation [unadjusted]	−0.0287**	−0.0586**	−0.1397***	−0.1414	2.6615***	2.6903***
	(−2.40)	(−1.99)	(−3.19)	(−0.94)	(3.99)	(4.03)

rotation, suggesting passive valuation effects are unlikely to drive the performance findings. Table A3 of the Supplementary Material shows that, after fees are accounted for, funds in the highest country rotation quintile outperform benchmark indexes by 0.14% per month (or 1.68% per year).

B. Dollar Country Rotation and Value Added

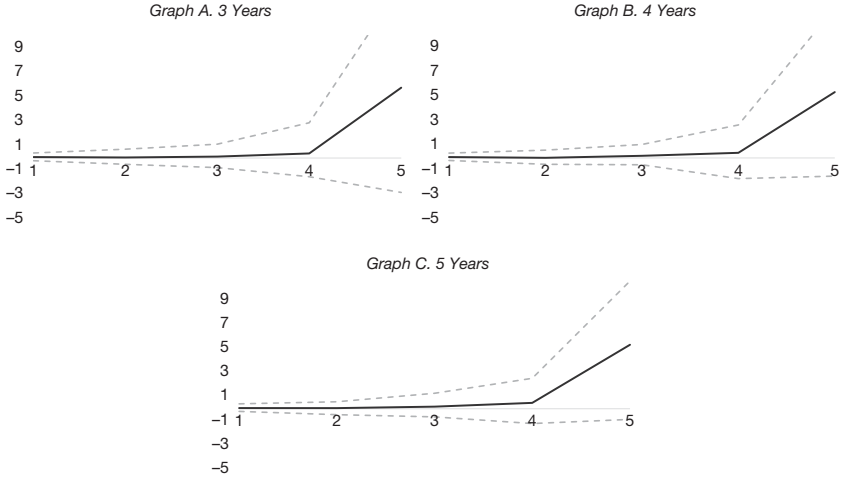
Berk and van Binsbergen (2015) propose value added as a measure of mutual fund skill. Value added measures the dollar value that the fund manager extracts from the capital market and depends on both the abnormal return level and the amount of fund assets. If certain funds can identify investment risks and opportunities in different markets, the value they add from rotating assets across countries should be related to the product of country rotation and fund size. For example, a fund with $1 billion in AUM that moved 1% of its assets out of a country before that country's market crash would have added more value (or, at least, destroyed less value) than a fund with $1 million AUM that moved 10% of its assets out. We study the relation between dollar country rotation and value added in this section, calculating dollar country rotation as the product of country rotation and fund size at the quarter end.

Following the approach of Berk and van Binsbergen (2015), we calculate the average value added for each fund in the sample, where value added is the fund benchmark-adjusted monthly raw return multiplied by fund size in the previous

FIGURE 2

Dollar Country Rotation and Out-of-Sample Value Added

Figure 2 displays the average out-of-sample value added (in millions of Y2000 dollars/month) of funds sorted into quintiles on the dollar country rotation (horizontal axes) over the future horizon indicated by the graph title. Group 5 indicates the group of funds with the highest dollar country rotation. The solid line indicates the average out-of-sample value added of each fund group, and the dashed lines indicate the 2-standard-deviation bounds.



month. We adjust all fund size numbers by inflation by expressing all numbers in Jan. 1, 2000 dollars. For each fund, we calculate its average dollar country rotation in the sample and rank funds into quintiles based on their average dollar country rotation. We then report the crosssectional mean value added for funds in each of the five groups.[8]

In Panel B of Table 3, we find that the group of funds with the highest dollar country rotation has an average monthly value added of $2.73 million per fund. Namely, the average fund in this group has added value by extracting an economically significant $33 million a year (in Jan. 1, 2000 dollars) from global financial markets. In contrast, the group of funds with the lowest dollar country rotation shows an average value added of –$24,500 per month. Again, we observe very similar findings when applying the unadjusted country rotation measure.

In Figure 2, we also test whether dollar country rotation can predict out-of-sample value added, following the approach of Berk and van Binsbergen (2015). At the end of each quarter, we sort funds into 5 quintiles based on their average dollar country rotation up to that point. We compute the monthly average value added for each fund over different future horizons, varying between 3 to 5 years. We then average over funds in each dollar country rotation quintile. Figure 2 plots the time-series mean value added as well as the 2-standard-deviation bounds for each group and time horizon. Funds in the highest dollar country rotation category exhibit

[8]Pástor, Stambaugh, and Taylor (2017) point out that a regression of value added on dollar turnover would involve a heteroskedasticity problem since larger funds tend to have more volatile residuals. A regression of value added on dollar country rotation would be subject to the same concern. As a result, we do not conduct regression analysis here.

higher out-of-sample value added over the future 3- to 5-year horizons than funds in other groups.

C. Country Rotation and Fund Performance Across Fund Size or Stock Turnover Groups

Fund size is one of the most important fund characteristics and a strong predictor of fund performance (among others, Chen, Hong, Huang, and Kubik (2004)). Table 2 suggests that country rotation is strongly correlated with fund size. High country rotation funds tend to have small fund size. To alleviate the concern that the relation between country rotation and fund performance is driven by fund size, we categorize funds into terciles based on their fund size and examine the effects of country rotation on fund performance for each fund size group. Panel A of Table A4 of the Supplementary Material shows that funds with high country rotation significantly outperform those with low country rotation among groups of funds with medium or small fund size. Funds with large AUM would have low country rotation intensity. Thus, we do not see a positive relation between country rotation and performance among the largest funds. In Panel B of Table A4, we examine the relation between dollar country rotation and value added for each fund size group. Across all the fund size groups, funds with high dollar country rotation have significantly higher value added than those with low dollar country rotation.

We also examine whether the relation between country rotation and fund performance is driven by a fund's overall stock turnover instead of by rotating assets across countries. Indeed, Table 2 does suggest that our country rotation measure is highly correlated with stock turnover. In Table A5 of the Supplementary Material, we categorize funds into terciles based on their stock turnover and examine the effects of country rotation on fund performance for each stock turnover group. Panel A of Table A5 shows that funds with high country rotation significantly outperform those with low country rotation among groups of funds with high or medium stock turnover. Funds with low stock turnover naturally also have low country rotation intensity. Thus, we do not see a significant relation between country rotation and performance among the lowest turnover funds. In Panel B of Table A5, we further examine the relation between dollar country rotation and value added for each stock turnover group. We see value added increase as dollar country rotation increases for all 3 stock turnover groups. Overall, these findings suggest that the positive impact of country rotation on fund performance is unlikely driven by fund size or funds' overall stock turnover.

D. Panel Regressions

In this subsection, we run the following panel regressions:

$$R_{i,t+1} = \alpha + \beta \times country\ rotation_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t+1}, \tag{1}$$

where $R_{i,t+1}$ is fund i's performance in period $t+1$ and $country\ rotation_{i,t}$ is fund i's country rotation in period t. Fund performance is reported monthly, but country rotation is measured every quarter. We use fund performance in month $t+1$, and $country\ rotation_{i,t}$ is the fund's country rotation for the most recent quarter that ends

before month $t + 1$. γ_i and δ_t are fund and month fixed effects, respectively. We report the results in Table 4. The control variables include fund size, fund risk, expense ratio, stock turnover, within-country stock turnover, annual turnover ratio reported by Morningstar, fund age, number of managers, active share, industry concentration, and country concentration. These control variables have been documented in prior studies to have been linked to subsequent mutual fund performance.[9]

Three measures of fund portfolio composition have been found in the literature to affect performance. They are active shares (Cremers and Petajisto (2009), Petajisto (2013)), industry concentration (Kacperczyk, Sialm, and Zheng (2005)), and country concentration (Choi et al. (2017)). Controlling active shares addresses the concern that country rotation simply captures the activeness of the funds. Controlling the fund's industry concentration also alleviates the concern that funds with higher country rotation intensity perform better simply because they hold more industrially diversified portfolios (Roll (1992), Heston and Rouwenhorst (1994), and Griffin and Karolyi (1998)). Controlling 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.

In column 1 of Panel A of Table 4, the dependent variable is fund benchmark-adjusted raw return. The coefficient on country rotation is 0.0049 with a *t*-statistic of 2.94. The standard deviation of country rotation is 5.1%. Thus, 0.0049 implies that a 1-standard-deviation increase in a fund's country rotation translates into an increase in annualized fund benchmark-adjusted raw returns of 0.3% (=0.0049 × 0.051 × 12). This number is economically large—a 50% increase relative to the average annualized fund benchmark-adjusted raw return, which equals 0.6%.

In that same column 1, we control for the fund's annual turnover reported by Morningstar. The turnover ratio reported by Morningstar is at the annual frequency and structurally different from our country rotation measure.[10] Thus, we also examine the relation between country rotation and fund performance after controlling for stock turnover between 2 quarters or within-country stock turnover between 2 quarters. The definitions of stock turnover and within-country stock turnover between 2 quarters are described previously in Section II. In columns 2 and 3 of Panel A, we first look at the impact of stock turnover or within-country stock turnover on fund performance. We find that stock turnover is not significantly related to subsequent fund performance, and the coefficient on within-country stock turnover is positive and marginally significant. In columns 4 and 5, we test the

[9]We draw on important existing work to guide our expectations in these panel regressions. Chen, Hong, Huang, and Kubik (2004) find fund size erodes mutual fund performance. Jordan and Riley (2015) find a negative relation between fund return volatility and 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. Bär, Kempf, and Ruenzi (2011) find single managers are much more likely to achieve extreme (good or bad) performance outcomes.

[10]Morningstar's annual fund turnover ratio is a measure of a fund's trading activity, which is calculated by taking the lesser of purchases or sales (excluding all securities with maturities of less than 1 year) and dividing by average monthly net assets.

TABLE 4

Country Rotation and Fund Performance

Table 4 presents the effects of country rotation on fund performance. In Panel A, we run the following regressions: $R_{i,t+1} - R^{bench}_{i,t+1} = \alpha + \beta \times country\ rotation_{i,t} + \varepsilon_{i,t+1}$, where $R_{i,t+1}$ is fund i's raw return in month $t+1$, $R^{bench}_{i,t+1}$ is the Morningstar category benchmark return in month $t+1$, and $country\ rotation_{i,t}$ is fund i's lagged country rotation. In Panel B, we standardize country rotation, stock turnover, and within-country stock turnover to have a mean of 0 and a standard deviation of 1. In Panel C, the dependent variable is $\sum_{c=1}^{C} w_{i,c,t}\left(R_{i,c,t+1} - R_{rf,t+1} - \beta^{mkt}_{i,c,t} MKT_{t+1} - \beta^{smb}_{i,c,t} SMB_{t+1} - \beta^{hml}_{i,c,t} HML_{t+1}\right)$, where $w_{i,c,t}$ is fund i's portfolio weight of stock holdings in country c in the most recent quarter-end before month $t+1$, $R_{i,c,t+1}$ is fund i's equity holding return in country c in month $t+1$, $R_{rf,t+1}$ is the 1-month U.S. treasury yield. The coefficients $\beta^{mkt}_{i,c,t}$, $\beta^{smb}_{i,c,t}$, and $\beta^{hml}_{i,c,t}$ are the estimated loadings of a fund's equity holding returns in country c on the Fama and French (2012) global market (MKT_{t+1}), size (SMB_{t+1}), and value (HML_{t+1}) factor returns for month $t+1$. These coefficients are obtained by regressing the fund's equity holding returns in country c over the past 12 months (up to the quarter-end before month $t+1$) on the global market, size, and value factors. The definitions of country rotation, stock turnover, and within-country stock turnover are in Table 1. Fund risk is the past 12-month fund monthly return volatility. Fund and month fixed effects are included. In Panels B and C, we apply the same control variables and fixed effects as in Panel A. *t*-statistics are reported in parentheses. Standard errors are double-clustered by category and by month. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Baseline

	1	2	3	4	5
	$R_{i,t+1} - R^{bench}_{i,t+1}$				
Country rotation	0.0049**			0.0073**	0.0044**
	(2.94)			(2.27)	(2.30)
Stock turnover		0.0020		−0.0022	
		(1.54)		(−1.10)	
Within-country stock turnover			0.0001*		0.0000
			(1.86)		(0.72)
Fund size	−0.0012***	−0.0013***	−0.0013***	−0.0012***	−0.0012***
	(−6.13)	(−6.10)	(−6.09)	(−6.11)	(−6.09)
Fund risk	0.0060	0.0067	0.0063	0.0064	0.0059
	(0.15)	(0.17)	(0.16)	(0.16)	(0.15)
Expense ratio	0.0035	0.0052	0.0042	0.0033	0.0036
	(0.09)	(0.14)	(0.11)	(0.09)	(0.10)
Turnover (Morningstar)	0.0000				
	(0.17)				
Fund age	0.0008	0.0007	0.0007	0.0008	0.0008
	(1.19)	(1.15)	(1.10)	(1.19)	(1.18)
No. of managers	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000
	(−0.06)	(−0.06)	(−0.10)	(−0.05)	(−0.07)
Active share	0.0020	0.0024	0.0027	0.0019	0.0021
	(0.73)	(0.91)	(1.01)	(0.71)	(0.77)
Industry concentration	0.0049	0.0050	0.0052	0.0049	0.0050
	(0.77)	(0.78)	(0.82)	(0.77)	(0.80)
Country concentration	0.0006	0.0005	0.0007	0.0006	0.0006
	(0.32)	(0.26)	(0.37)	(0.33)	(0.35)
Fund FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1420	0.1420	0.1420	0.1420	0.1420
Observations	86,797	86,797	86,797	86,797	86,797

Panel B. Standardized Variables

	1	2	3	4	5
	$R_{i,t+1} - R^{bench}_{i,t+1}$				
Country rotation*	0.0003**			0.0004**	0.0002**
	(2.94)			(2.27)	(2.30)
Stock turnover*		0.0001		−0.0002	
		(1.54)		(−1.10)	
Within-country stock turnover*			0.0002*		0.0001
			(1.86)		(0.72)
Controls	Yese	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1420	0.1420	0.1420	0.1420	0.1420
Observations	86,797	86,797	86,797	86,797	86,797

(continued on next page)

TABLE 4 (continued)
Country Rotation and Fund Performance

Panel C. Fund Performance Adjusted for Country-Level Time-Varying Risk Exposure

	1	2	3	4	5
	$\sum_{c=1}^{C} w_{i,c,t}\left(R_{i,c,t+1} - R_{rf,t+1} - \beta_{i,c,t}^{mkt} MKT_{t+1} - \beta_{i,c,t}^{smb} SMB_{t+1} - \beta_{i,c,t}^{hml} HML_{t+1}\right)$				
Country rotation	0.0060***			0.0086*	0.0062**
	(3.34)			(2.14)	(2.38)
Stock turnover		0.0025		−0.0025	
		(1.71)		(−0.86)	
Within-country stock turnover			0.0001		−0.0000
			(1.24)		(−0.06)
Controls	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.2216	0.2215	0.2215	0.2216	0.2216
Observations	87,436	87,436	87,436	87,436	87,436

relation between country rotation and future fund performance after controlling for stock turnover or within-country stock turnover. We find the coefficients on country rotation remain positive and statistically significant. The coefficients on stock turnover or within-country stock turnover are insignificant. In Panel B of Table 4, we standardize these measures to compare coefficients, and the economic impact of country rotation proves larger than that of stock turnover and within-country stock turnover. These findings suggest that country rotation is more important than the overall portfolio turnover or within-country stock turnover for international fund performance.

We conduct a further regression analysis to address a concern that the observed positive relationship between country rotation and performance might be attributed to funds' exposure to global market risk or currency risk factors. We regress fund returns on country rotation intensity, along with estimated factor loadings on global market factors (Fama and French (2012), (2017)), and dollar and carry currency risk factors (Lustig, Roussanov, and Verdelhan (2011)). The results in Table A6 of the Supplementary Material demonstrate that the positive and significant impact of country rotation on performance persists when adjusting for these risk factor exposures.

Our main country rotation measure is already adjusted for passive valuation effects, as noted previously. In order to understand the role of valuation effects further, we examine whether country rotation that is purely driven by the valuation effects is also related to future fund performance. We call country rotation driven by the valuation effects "passive" country rotation and compute it as:

$$\text{Passive country rotation} = \frac{1}{2}\sum_{c=1}^{C}\left|\frac{w_{c,q-1}\left(1+R_{c,q}^{E}\right)}{\left(1+R_{f,q}\right)} - w_{c,q-1}\right|,$$

where $w_{c,q-1}$ is the percentage of total net assets a fund allocates to country c at the end of quarter $q-1$, $R_{c,q}^{E}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q.

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The average measure of passive country rotation is 2.4% of fund total net assets, with a median of 2.2% and a standard deviation of 1.2%. In Table A7 of the Supplementary Material, we find that passive country rotation is not related to subsequent fund performance. But, after controlling for passive country rotation, we still observe a reliably positive relation between country rotation and fund performance. Thus, the country allocation changes driven by passive valuation effects do not appear to be predictive of fund returns.

Global equity markets have experienced important shifts in their industrial composition over time that have been shown to matter for returns, market volatility, and return correlations.[11] As a result, we argue it is important to examine the potential relation between *industry* rotation intensity and subsequent fund performance in our sample of active international equity funds. We construct industry rotation to measure the extent to which a fund changes its industry asset allocations tactically between 2 quarters. Table A8 of the Supplementary Material shows that industry rotation is not related to subsequent fund performance. After controlling for industry rotation, country rotation still has positive and significant coefficients. This finding suggests that industry rotation does not contribute to active international fund performance.

E. Fund Performance Adjusted for Country-Level Time-Varying Risk Exposure

In the previous subsections, we adjust fund returns relative to their Morningstar category benchmarks. Yet, the method does not account for the country-level variations in systematic risk exposure when funds change country asset allocations over time. For example, a fund may outperform its benchmark if it overweights countries with higher exposures to systematic risks. To address this, we refine our performance measurement by adjusting for country-specific, time-varying exposure to risk factors.

Specifically, we first run the rolling-window regression model of fund i's country c holdings excess returns on Fama and French global market, size, and value factors (Fama and French (2012)) using return data in the 12 months prior to the quarter-end before month $t + 1$. Fund i's country c holdings excess returns are calculated based on the holdings at the quarter end before month $t + 1$. We obtain $\beta^{mkt}_{i,c,t}$, $\beta^{smb}_{i,c,t}$, and $\beta^{hml}_{i,c,t}$ from the rolling-window regressions. Then, we compute fund performance as:

$$\sum_{c=1}^{C} w_{i,c,t}\left(R_{i,c,t+1} - R_{rf,t+1} - \beta^{mkt}_{i,c,t} MKT_{t+1} - \beta^{smb}_{i,c,t} SMB_{t+1} - \beta^{hml}_{i,c,t} HML_{t+1}\right),$$

where $w_{i,c,t}$ is fund i's equity portfolio weight in country c in the most recent quarter-end before month $t+1$, $R_{i,c,t+1}$ is fund i's equity holding return in country c in month $t+1$, $R_{rf,t+1}$ is the U.S. treasury yield, MKT_{t+1}, SMB_{t+1}, and HML_{t+1} are the Fama and French global market, size, and value factor returns in month $t + 1$.

[11] Roll (1992), Heston and Rouwenhorst (1994), and Griffin and Karolyi (1998) document the role of industrial composition in international stock returns.

This approach allows us to take into account the most recent country asset allocations by the fund in each period and adjust the time-varying systematic risk exposures for the fund's country-level portfolios. In Panel C of Table 4, we apply the fund performance adjusted for country-level time-varying risk exposure as the dependent variable. The relation between country rotation and subsequent fund performance remains statistically reliable and economically large.

F. Country Rotation-Performance Relations for Regional Funds and Index Funds

In Table A9 of the Supplementary Material, we perform a counterfactual test of the country rotation-performance relation using active regional funds. A good number of active international equity funds focus on a region or a country.[12] If the positive country rotation-performance relationship in the funds with global mandates is due to skills in identifying risks and opportunities in different countries, then the narrower geographical scope of active regional funds should mechanically weaken the relationship. We, therefore, expect to find that the country rotation-performance relation is weaker among active regional funds. Table A9 of the Supplementary Material shows that country rotation no longer predicts subsequent fund returns among active regional funds, affirming our conjecture and offering further positive evidence of the country rotation intensity effect we uncover in this article.

We further test the country rotation-performance relationship based on passive U.S. international index funds with global mandates in Table A9 of the Supplementary Material. We observe country rotation for index funds because country weight changes could be simply driven by the passive valuation effects of underlying assets. The mean, median, and standard deviation of country rotation for index funds are 5.5%, 2.6%, and 9.2%. If, however, the country rotation-performance relationship comes from active fund managers' skills, the index funds should not exhibit such a relationship. Indeed, we find that country rotation no longer predicts future returns among international equity index funds.

G. Country Market Timing and Stock Picking

In previous subsections, we document the positive relation between country rotation and future fund performance. It is natural to ask whether the country rotation skill is related to country market timing or stock picking. Following the methodology of Kacperczyk, van Nieuwerburgh, and Veldkamp (2014), we construct measures for stock picking and country market timing.

Our Timing measure reflects a fund's ability to time the local country stock markets by calculating the difference between a fund's asset allocation to a stock

[12]Active international equity funds with regional investment mandates include funds in the following Morningstar categories: Diversified Emerging Markets, Diversified Pacific/Asia, Pacific/Asia ex-Japan Stock, China Region, India Equity, Japan Stock, Europe Stock, and Latin America Stock.

and the stock's weight in the global market, adjusted for the stock's exposure to its local market's returns. That is, for a fund i that holds different stocks s at time t:

$$\text{Timing} = \sum_{s=1}^{S} \left(w_{s,t}^{i} - w_{s,t}^{m} \right) \left(\beta_{s,t} R_{t+1}^{c} \right),$$

where $w_{s,t}^{i}$ is the percentage of total net assets fund i allocates to stock s at time t, $w_{s,t}^{m}$ is the fraction of total world equity market capitalization in stock s, $\beta_{s,t}$ is estimated using rolling-window regressions by regressing stock s's excess returns on its corresponding country market c's excess returns using data between month t − 11 to month t, and R_{t+1}^{c} is country c's market return in month t + 1. Our Picking measure, on the other hand, assesses a fund's ability to select stocks that outperform their local market by accounting for the difference between a stock's actual return and the return predicted by its sensitivity to the local market. Consider for a fund i that holds different stocks s at time t:

$$\text{Picking} = \sum_{s=1}^{S} \left(w_{s,t}^{i} - w_{s,t}^{m} \right) \left(R_{t+1}^{s} - \beta_{s,t} R_{t+1}^{c} \right),$$

where R_{t+1}^{s} is stock s's return in month t + 1.

In Table 5, our analysis reveals that country rotation is positively and significantly associated with the subsequent timing measure. This means that country rotation primarily contributes to performance through country market timing. However, the relationship between country rotation and the picking measure is insignificant, suggesting that stock picking is not the primary channel through which country rotation impacts fund performance. Overall, our results show that the impact of country rotation on overall fund performance primarily arises from the country market timing abilities rather than stock picking.

TABLE 5

Country Rotation, Timing, and Picking

Table 5 regresses timing and picking measures on lagged country rotation. $Timing_{i,t+1} = \sum_{s=1}^{S} \left(w_{s,t}^{i} - w_{s,t}^{m} \right) \left(\beta_{s,t} R_{t+1}^{c} \right)$, where $w_{s,t}^{i}$ is the percentage of total net assets fund i allocates to stock s at time t, $w_{s,t}^{m}$ is the fraction of the global stock market capitalization in stock s, $\beta_{s,t}$ is estimated using rolling-window regressions by regressing stock s's excess returns on its corresponding country market c's excess returns using data between month t - 11 to month t, and R_{t+1}^{c} is country c's market return denominated in U.S. dollars in month t + 1. $Picking_{i,t+1} = \sum_{s=1}^{S} \left(w_{s,t}^{i} - w_{s,t}^{m} \right) \left(R_{t+1}^{s} - \beta_{s,t} R_{t+1}^{c} \right)$, where R_{t+1}^{s} is stock s's return denominated in U.S. dollars in month t + 1. The definitions of country rotation and within-country turnover are in Table 1. Fund and month fixed effects are included. We include the same control variables in Table 4, column 5. t-statistics are reported in parentheses. Standard errors are double-clustered by category and by month. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Timing	Picking
	1	2
Country rotation	0.0081**	0.0014
	(3.08)	(0.91)
Within-country stock turnover	−0.0001*	0.0000
	(−2.03)	(0.92)
Controls	Yes	Yes
Fund FE	Yes	Yes
Month FE	Yes	Yes
Adjusted R^2	0.8695	0.1050
Observations	87,451	87,451

V. Country Weight Changes and the Performance of a Fund's Country Holdings

All of our analysis so far focuses on the country rotation and performance at the fund level. The building blocks of our country rotation intensity measure are the country weight changes in each country for each fund. If funds adjust their country asset allocation intensity to navigate the changing investment environments in different countries, then we should also observe a positive relation between country weight changes and subsequent fund country holding performance. Thus, it is natural to extend our analysis to the fund-country level and delve into fund equity holdings to see if country weight changes are associated with subsequent fund country holding returns.

A. Baseline Results

In Table 6, we run the following regression:

$$R_{i,c,t+1} = \alpha + \beta \times \Delta w_{i,c,t} + \gamma_i + \theta_c + \delta_t + \varepsilon_{i,c,t+1}, \quad (2)$$

where $R_{i,c,t+1}$ is the fund i's equity holding return denominated in U.S. dollars in country c in period $t+1$ and $\Delta w_{i,c,t}$ is fund i's country weight change in country c in period t. Fund country holding returns are calculated at the monthly frequency, but country weight changes are measured every quarter. Thus, we use fund country holding returns in month $t+1$, and $\Delta w_{i,c,t}$ is the country weight change for the most

TABLE 6

Country Weight Change and Fund Country Holding Performance

Table 6 presents the effects of country weight change on fund country holding performance. In columns 1 to 3, we run the regressions: $R_{i,c,t+1} = \alpha + \beta \times \Delta w_{i,c,t} + \varepsilon_{i,c,t+1}$, where $R_{i,c,t+1}$ is the fund i's equity holding return in country c in month $t+1$ denominated in U.S. dollars and $\Delta w_{i,c,t}$ is fund i's lagged country weight change in country c. $\Delta w_{i,c,t} = w_{c,q} - \frac{w_{c,q-1}(1+R^E_{c,q})}{(1+R_{f,q})}$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, on or before month t, $R^E_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the corresponding fund's raw return during quarter q. In columns 4 to 6, we run the regressions: $R_{i,c,t+1} = \alpha + \beta_1 \times \Delta w_{i,c,t} + \beta_2 \times w^{excess}_{i,c,t} + \varepsilon_{i,c,t+1}$, where $w^{excess}_{i,c,t}$ is fund i's lagged country excess weight in country c. $w^{excess}_{i,c,t} = w_{c,q} - w_{world,c,q}$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, on or before month t, and $w_{world,c,q}$ is country c's stock market weight in the global stock market at the end of quarter q. We include all the observations in columns 1 and (4). We focus on observations with $\Delta w_{i,c,t}>0$ in columns 2 and 5 and observations with $\Delta w_{i,c,t}<0$ in columns 3 and 6. Fund, country, and month fixed effects are included. t-statistics are reported in parentheses. The standard errors are double-clustered by category and by month. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Fund Country Holding Return					
	All	$\Delta w_{i,c,t}>0$	$\Delta w_{i,c,t}<0$	All	$\Delta w_{i,c,t}>0$	$\Delta w_{i,c,t}<0$
	1	2	3	4	5	6
$\Delta w_{i,c,t}$	0.0271**	−0.0025	0.0327**	0.0249**	−0.0145	0.0425**
	(2.57)	(−0.13)	(2.27)	(2.36)	(−0.73)	(2.93)
$w^{excess}_{i,c,t}$				0.0059**	0.0060**	0.0073***
				(2.94)	(2.74)	(3.39)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.3873	0.3877	0.3881	0.3873	0.3877	0.3881
Observations	1,919,167	1,004,311	914,856	1,919,167	1,004,311	914,856

recent quarter that ends before month $t + 1$. In other words, we use the country weight changes computed at a quarter-end to predict the fund country holding monthly returns of the 3 months after that quarter-end.

Country weight change is computed as:

$$\Delta w_{i,c,t} = w_{c,q} - \frac{w_{c,q-1}\left(1 + R^{E}_{c,q}\right)}{\left(1 + R_{f,q}\right)},$$

where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, on or before month t, $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q - 1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the corresponding fund's raw return during quarter q. In Figure 3, we report the average absolute country weight change for the 10 countries with the largest changes and plot the absolute country weight changes over time. The U.K. has the largest average absolute country weight change at 1.29% of fund total net assets. Other countries associated with large country weight changes are Japan, the U.S., Germany, France, Switzerland, China, Canada, the Netherlands, and Australia. The country weight changes in China experienced a large increase from the 1990s to the 2000s. The country weight changes in the other 9 countries are relatively stable over time.

To compute fund equity holding returns in a country, each stock holding is weighted by the fund's dollar investments of this stock as a fraction of the fund's total dollar investments of all stock holdings in the same country. We include $\gamma_i, \theta_c, \delta_t$ as fund fixed effects, country fixed effects, and month fixed effects, respectively. If there is a positive relation between country weight changes and subsequent fund country holding returns, we should observe β is positive and reliable. In column 1 of Table 6, β is 0.0271 with a t-statistic of 2.57. The standard deviation of $\Delta w_{i,ct}$ is 1.00%. Thus, a coefficient of 0.0271 means that a 1-standard-deviation increase in country weight change is associated with a 0.33% (= 0.0271 × 0.0100 × 12) annualized increase in returns that a fund earns from a country. On average, a fund earns an annualized return of 0.43% from any one given country.[13] So, by this logic, a 0.33% increase implies a 76.5% increase relative to the average annualized returns that a fund earns from one country.

To achieve superior returns from changing country weights, funds could either benefit from increasing portfolio weights in a country to exploit the upside or lower their exposure to a country to avoid the downside on their country holdings. Thus, to better understand the positive relation between country weight changes and subsequent fund country holding returns, we split observations into those with a country weight increase (namely, $\Delta w_{i,c,t} > 0$) and those with a country weight decrease (namely, $\Delta w_{i,c,t} < 0$).

In columns 2 and 3 of Table 6, we find that the positive relation between country weight changes and subsequent fund country holding returns is mainly driven by funds correctly reducing their country weights before subsequent poor

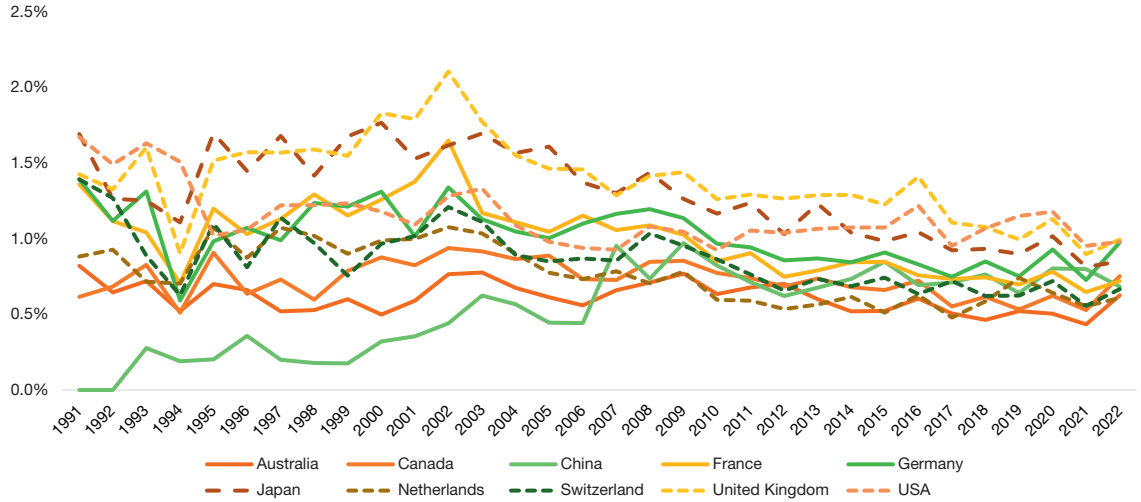
[13] A fund, on average, allocates about 4.55% of its total assets to one country, and the average annualized fund country holding return in one country is 9.48%. Thus, on average, a fund makes an annualized return of 0.43% (=0.0455 × 0.0948) from one country.

FIGURE 3

Country Weight Change over Time

Figure 3 presents the average absolute country weight change in each country. Absolute country weight change is computed as $|w_{c,q} - \frac{w_{c,q-1}\left(1+R^{E}_{c,q}\right)}{\left(1+R_{f,q}\right)}|$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, on or before month t, $R^{E}_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the corresponding fund's raw return during quarter q. The panel shows each country's average absolute country weight change. The figure shows each country's average absolute weight change over time. We focus on the 10 countries with the largest average absolute country weight change.

Average absolute country weight change									
United Kingdom	Japan	USA	Germany	France	Switzerland	China	Canada	Netherlands	Australia
1.29%	1.18%	1.07%	0.95%	0.90%	0.78%	0.72%	0.70%	0.69%	0.60%



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fund country holding returns. When funds increase their exposure to a country, country weight changes do not predict subsequent fund country holding performance. This finding indicates that the more funds lower their exposure to a country in a quarter, the worse the subsequent fund country holding performance in that country would be. Namely, funds are good at avoiding the downside risks.

B. Country Weight Changes and Country Excess Weights

Prior research on active country allocation strategies highlights the benefits of international funds concentrating on specific countries; examples include van Nieuwerburgh and Veldkamp (2009), Choi et al. (2017), and Jagannathan, Jiao, and Karolyi (2022). To reflect a fund's concentration on a country, we construct country excess weights as:

$$w_{i,c,t}^{excess} = w_{c,q} - w_{world,c,q},$$

where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, on or before month t, and $w_{world,c,q}$ is country c's stock market weight in the global stock market at the end of quarter q. We calculate a country's stock market capitalization by aggregating the market capitalization of all the primary stocks in that country covered by the Datastream data set and compute the global market capitalization by aggregating the market capitalization of all the primary stocks in all the countries. In columns 4 to 6 of Table 6, we regress future fund country holding returns on country weight changes and country excess weights to examine whether country weight changes can still predict fund country holding returns after controlling for country excess weights. We find that country excess weights are associated with subsequent fund country holding returns. After controlling for country excess weights, country weight changes are still significantly related to subsequent fund country holding returns. The positive relation happens on the downside when funds lower their country weights before subsequent poor fund country holding returns.

To further understand the impact of country weight changes and country excess weights, we study the persistence of country rotation, country weight changes, and country excess weights in Table A10 and Table A11 of the Supplementary Material. When we regress country rotation on lagged country rotation in Panel A of Table A10, we find that fund-level country rotation is persistent (see also Figure A1). Similarly, when we regress country excess weights on lagged country excess weights in Table A11, we find that country excess weights in the same country are highly persistent over time. In contrast, when we regress country weight changes on lagged country weight changes in Panel B of Table A10, we find minimal persistence for country weight changes.

Overall, we interpret country excess weights as a long-term asset allocation strategy, indicating a focus on specialization within a country. In contrast, changes in country weights represent short-term investment decisions, where funds adjust their positions by moving in and out of different countries. These findings also suggest that while fund-level country rotation is persistent, at the fund-country level, funds actively rotate assets across different countries in response to signals in

different markets. Our article centers on these country weight changes and finds that they can effectively predict future returns.

C. Market Segmentation, Developed Versus Emerging Markets, and Country Market Volatility

In a partially segmented world, local market variance is priced and could lead to higher expected returns. High country rotation funds could have larger allocations to more volatile countries and thus generate better performance. To alleviate this concern, we study whether the relation between country weight changes and fund country holding returns is driven by holdings in volatile and segmented markets.

We first investigate whether segmented markets drive our results. Bekaert, Harvey, Lundblad, and Siegel (2011) construct a measure of market segmentation across countries and show that highly segmented markets have high political risk, low stock market development, and high market volatility. We create an equivalent market segmentation measure for each country in our sample following Bekaert, Harvey, Lundblad, and Siegel (2011). In Table A12 of the Supplementary Material, we present the time-series average of the annual segmentation measure for each country. In Figure A2 of the Supplementary Material, we show the market segmentation for DMs, emerging markets (EMs), and the U.S. over time. In Table 7, we rerun regressions of fund holding returns on lagged country weight changes separately for countries with high and low segmentation. We find that a fund's country weight changes predict future fund country holding returns in countries with low market segmentation rather than high market segmentation.

We then classify countries into developed and EMs or based on their past 12-month stock market return volatility. EM and DM classification is based on the

TABLE 7

Country Weight Change and Fund Country Holding Performance: Country Characteristics

Table 7 presents the effects of country weight change on fund country holding performance. We run the regressions: $R_{i,c,t+1} = \alpha + \beta \times \Delta w_{i,c,t} + \varepsilon_{i,c,t+1}$, where $R_{i,c,t+1}$ is the fund i's equity holding return in country c in month $t+1$ denominated in U.S. dollars, $\Delta w_{i,c,t}$ is fund i's lagged country weight change in country c and $w^{excess}_{i,c,t}$ is fund i's lagged excess portfolio weight in country c. The definitions of $\Delta w_{i,c,t}$ and $w^{excess}_{i,c,t}$ are in Table 6. In columns 1 and 2, we categorize observations into two groups each year based on their associated countries' market segmentation measures (Bekaert, Harvey, Lundblad, and Siegel (2011)). High (low) market segmentation indicates observations in countries with segmentation earlier (later) the 80th percentile. In columns 3 and 4, we report the results for developed markets (DM) and emerging markets (EM), respectively. In columns 5 and 6, we categorize observations into two groups each quarter based on the corresponding countries' past 12-month stock market return volatility. High (low) country market volatility indicates observations in countries with stock market return volatility earlier (later) the 80th percentile. Fund, country, and month fixed effects are included. *t*-statistics are reported in parentheses. The standard errors are double-clustered by category and by month. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Fund Country Holding Return					
	High Segmentation	Low Segmentation	EM	DM	High Country Market Volatility	Low Country Market Volatility
	1	2	3	4	5	6
$\Delta w_{i,c,t}$	0.0043	0.0282**	−0.0048	0.0324***	−0.0150	0.0352***
	(0.19)	(2.81)	(−0.11)	(3.28)	(−0.62)	(3.40)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.3915	0.3991	0.3336	0.4277	0.3889	0.4076
Observations	401,519	1,517,648	343,237	1,575,930	405,234	1,513,933

International Monetary Fund (IMF) classification of advanced economies and emerging economies. In columns 3 to 6 of Table 7, we find that a fund's country weight changes predict future fund country holding returns mainly in DMs and among countries with relatively low volatility.

Overall, our findings demonstrate that the key driver of our results is that funds actively rotate assets across countries rather than their exposure to volatile or segmented markets.

D. Country Market Timing, Stock Picking, and the Role of Currency Returns

In Table 8, we examine the role of country market timing, stock picking, and currency returns. We relate fund country holding performance to three factors: country market returns in local currency, the stock-picking component in local currency (i.e., fund country holding returns in local currency minus country market returns in local currency), and currency valuation returns (i.e., the returns in U.S. dollars from foreign currency valuation changes). The currency valuation return is computed as $\frac{S_{c,t+1}}{S_{c,t}} - 1$, where $S_{c,t}$= *$/foreign currency.* We regress these three factors on country weight changes, respectively. We also examine another specification with the logarithm versions of returns, where the fund country holding

TABLE 8

Country Market Returns, Stock Picking, and Currency Returns

Table 8 presents the effects of country weight change on fund country holding performance. In column 1, we run the regressions: $R_{i,c,t+1} = \alpha + \beta \times \Delta w_{i,c,t} + \varepsilon_{i,c,t+1}$, where $R_{i,c,t+1}$ is the fund i's equity holding return in country c in month $t + 1$ denominated in U.S. dollars and $\Delta w_{i,c,t}$ is fund i's lagged active country weight change in country c, as defined in Table 6. In column 2, the dependent variable is the country market return denominated in local currency, $R_{c,local,t+1}$. In column 3, the dependent variable is fund country holding return denominated in local currency minus country market return in local currency, $R_{i,c,local,t+1} - R_{c,local,t+1}$. In column 4, the dependent variable is the return in U.S. dollars from changes in foreign currency valuation, $R_{currency,c,t+1}$, calculated as $\frac{S_{c,t+1}}{S_{c,t}} - 1$, where $S_{c,t}$ represents the exchange rate expressed as USD per unit of foreign currency. Column 4 focuses on non-U.S. holdings. In Panels A and B, we report the results for observations with $\Delta w_{i,c,t} > 0$ and $\Delta w_{i,c,t} < 0$, respectively. Fund, country, and month fixed effects are included. *t*-statistics are reported in parentheses. The standard errors are double clustered by category and by month. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Fund Country Holding Return	Country Market Return (local currency)	Fund Country Holding Return – Country Market Return (local currency)	FX Return
	1	2	3	4
Panel A. $\Delta w_{i,c,t} > 0$				
$\Delta w_{i,c,t}$	−0.0025	−0.0342**	0.0285	0.0009
	(−0.13)	(−2.45)	(1.68)	(0.16)
Fund FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.3877	0.5269	0.0121	0.5107
Observations	1,004,311	1,004,311	1,004,311	951,651
Panel B. $\Delta w_{i,c,t} < 0$				
$\Delta w_{i,c,t}$	0.0327**	0.0410***	−0.0074	0.0061
	(2.27)	(3.70)	(−0.48)	(0.92)
Fund FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.3881	0.5450	0.0092	0.5218
Observations	914,856	914,856	914,856	869,932

returns would linearly decompose into these three components (see Table A13 of the Supplementary Material). The results are similar.

Panel A of Table 8 shows that when funds increase their weights in a country, they might earn superior returns from picking stocks but attain lower returns through poor country market timing. There is no effect associated with foreign currency returns. Overall, country weight changes are not significantly related to fund country holding returns when funds increase the weights in a country. The reason for no upside gain may be because funds hold very few stocks in each country. The median number of holdings for each fund in one country in a quarter is only 3 stocks on average, as documented in Table A14. It is not very likely that funds holding three 3 in a country are trying to time the upside of local stock markets or local currency appreciation. When increasing weights in a country, funds may prioritize selecting stocks that outperform local markets but downplay or neglect the risks of local stock market fluctuations. They might wrongly believe the superior performance of the purchased equity holdings could outweigh the downside risks of local stock markets.

Panel B of Table 8 shows that when funds decrease their weights in a country, that country's stock market would perform poorly in the subsequent period. Funds do not show stock picking or currency timing ability when reducing their country weights in a country. Overall, these findings suggest that when funds decrease country weights, they focus on monitoring macro environments and can successfully avoid downside risks of local stock markets.

E. Profits from Downside Country Market Timing

In the previous subsection, we show that the positive relation between country weight changes and subsequent fund country holding returns is mainly driven by the country market timing ability on the downside. It would be interesting to know from which markets the funds generate the highest profits from downside country market timing.

In Table 9, we compute profits from country market timing for fund i in country c during month $t+1$ as $\Delta w_{i,c,t}(R_{c,t+1} - R_{world,t+1})$, where $\Delta w_{i,c,t}$ is fund i's country weight change in country c during the most recent quarter before month $t+1$, $R_{c,t+1}$ is the is country c's market return denominated in U.S. dollars in month $t+1$, and $R_{world,t+1}$ is the MSCI ACWI return denominated in U.S. dollars in month $t+1$. Intuitively, the profit from country market timing measures the excess profit (relative to a global market benchmark) that would be generated in month $t+1$ based on changes in fund i's allocation to country c during the most recent quarter before month $t+1$. In column 2, we report the average country weight change in a quarter. In column 3, we report the average annual country market return in excess of the world return. Column 4 presents the average annual profits from downside country market timing. The average monthly profits are computed for each country by averaging all the observations in that country and then reporting the annualized profits. We present the results for the 5 countries with the largest average profits from downside market timing, which include Japan, the U.K., China, Ireland, and Germany. Of these countries, Japan has the highest profits at 0.066% per year.

TABLE 9

Profits from Downside Country Market Timing

Table 9 presents the average annual profits from downside country market timing. Profits from country market timing for fund i in country c during month $t+1$ are computed as $\Delta w_{i,c,t}(R_{c,t+1} - R_{world,t+1})$, where $\Delta w_{i,c,t}$ is fund i's country weight change in country c during the most recent quarter before month $t+1$, $R_{c,t+1}$ is the is country c's market return denominated in U.S. dollars in month $t+1$, and $R_{world,t+1}$ is the MSCI all country world index (ACWI) return denominated in U.S. dollars in month $t+1$. We compute fund i's country weight change in country c during the most recent quarter q before month $t+1$ ($\Delta w_{i,c,t}$) as $w_{c,q} - \frac{w_{c,q-1}(1+R^E_{c,q})}{(1+R_{f,q})}$, where $w_{c,q}$ is the percentage of total net assets a fund allocates to country c at the end of quarter q, $R^E_{c,q}$ is the fund's equity holding returns in country c during quarter q computed based on holdings at the end of quarter $q-1$ and is denominated in U.S. dollars, and $R_{f,q}$ is the fund's raw return during quarter q. This table focuses on country weight decreases. Column 2 reports the average country weight change. Column 3 reports the average annual country market return in excess of the world market return. Column 4 reports the average annual profits. We compute the average monthly profits for each country by averaging all the observations in that country and then report the annualized profits. We present the results for the 5 countries with the highest average profits from downside country market timing.

Country	Country Weight Change	Country Market Return – World Market Return	Profits
1	2	3	4
Japan	−1.164%	−5.396%	0.066%
United Kingdom	−1.288%	−3.720%	0.037%
China	−0.699%	−2.351%	0.032%
Ireland	−0.343%	−6.536%	0.025%
Germany	−0.852%	−2.309%	0.018%

F. The Effects of Country Weight Changes and Country Market Movements

In this subsection, we seek to understand whether the fund's profits from downside country market timing can be attributed to the magnitude of the market movements in a country or the change in weight that preceded the market movements.

In Panel A of Table A15 of the Supplementary Material, we classify observations associated with country weight decreases into three groups based on the magnitude of their weight changes. Column 2 indicates the three country weight change groups. In column 3, we report the average country weight change in a quarter. Column 4 shows the average annual country market return in excess of the world market return. Column 5 shows the average annualized profit per country for each group, calculated using the methods outlined in Section V.E. Our findings show that funds achieve higher profits from downside market timing when they significantly reduce their country weight. Additionally, poorer country market performance is associated with higher profits per country. Therefore, both the size of the country's weight decrease and the magnitude of the stock market swings contribute to the profitability of downside market timing in each country. Next, we conduct the analyses for each of the 5 countries with the highest average profits from downside country market timing. We observe similar patterns for the profits from these countries as in the full country sample in Panel A. Across all 5 countries, we find larger country weight decreases are associated with higher profits per country.

Moving beyond individual country profits, we analyze total profits from different groups of country weight changes in columns 6 and 7 of Panel B. While large weight decreases yield the highest profits per country, these cases are relatively rare, as indicated in column 6. In contrast, small weight decreases are more

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frequent, although they generate lower profits per country. Thus, a fund's total profits from each group depend on both the profit earned per country and the number of countries within each weight change group.

We compute a fund's total profits for each group in column 7 as *the percentage of observations in the group* × *average number of countries that a fund invests in* × *profits per country for the group*. We use the percentage of observations in each country weight change group multiplied by the average number of countries a fund invests in to estimate the number of countries in each group. The number of countries in each group is then multiplied by the profits per country for that group to calculate the total profits that a fund earns from all the countries in that group. Funds appear to earn similar total profits from large, medium, or small country weight changes.

In summary, Table A15 suggests that funds earn the highest profits per country when they make the largest country weight decrease to predict the poorest country market performance. Since there are fewer cases in which funds make these large decreases, they earn similar total profits from downside country market timing when making large or small country weight changes.

G. Country Rotation Strategies and Global Market Drawdowns

Our fund country-level analysis in Table 8 indicates that the positive relationship between country rotation and fund performance is primarily due to their ability to time country-by-country markets and, specifically, to sell country holdings ahead of subsequent poor country market performance. Previous literature, such as Longin and Solnik (2001), shows that international market correlations increase during bear markets. As a result, during a global drawdown, when most markets experience weak returns relative to recent peaks, high-country rotation funds would have limited opportunities to withdraw successfully from underperforming markets. In contrast, during normal periods, when only a few markets are underperforming, these funds can more effectively adjust allocations to avoid poor performance.

In Table A16 of the Supplementary Material, we test the performance of country rotation strategies during a global drawdown versus during normal periods. A global drawdown is defined as years when over 75% of countries' markets experience a drop of more than 5%. We also define an alternative measure when the annual return of the MSCI ACWI falls later −15%. We observe that country rotation influences fund performance and country timing ability mainly during normal periods and has little impact during a global drawdown.[14]

H. Characteristics of Managers and Funds

In this subsection, we link the characteristics of fund managers and funds to country rotation skills. Fund manager characteristics include home-linked managers and skilled managers who also manage active U.S. domestic equity funds.

[14]We examine several other unreported robustness checks linked to currency fluctuations and market drawdowns. For example, when a fund completely moves out of a country, the market subsequently drops dramatically. Also, unlike Sialm and Zhu (2022), we find much less currency hedging among international equity funds (only 4.15% of funds in a given quarter allocate more than 1% of assets). We also uncover no positive relation for the U.S. holdings of these international mutual funds. These results are available from the authors.

Jagannathan, Jiao, and Karolyi (2022) find that international fund managers have informational advantages on their home-country stock holdings. Following their approach, we collect managers' educational background information and associate the country where the manager received their undergraduate degree as their home country. For equity holdings in one country, we define home-linked managers as those managers from that same country. Home-linked managers' informational advantages could give them edges in stock-picking and market timing in their home countries.

If skilled managers have better general investment ability, then those who are skilled in managing their domestic investments might also conduct country rotations well. We identify skilled managers as the ones with the top 20% risk-adjusted returns in managing active U.S. domestic equity funds from 1991:Q1 to 2022:Q1. For each active U.S. domestic equity fund, we compute its risk-adjusted return by regressing fund raw returns on market, size, value, and momentum factors (Fama and French (1993), Carhart (1997)). Each manager's risk-adjusted return is the average risk-adjusted return of all the funds, which the manager manages. Finally, we consider fund family size. Fund families often provide various country macroeconomic outlooks and allocation forecasts. Larger fund families could possess more resources and local connections to collect and process information worldwide. Table A17 of the Supplementary Material shows that when funds increase country weights, home-linked managers are better at stock-picking. Skilled managers are notably better at anticipating the local stock market downturns.

I. Fund Stock-Level Regressions

In the previous subsections, we study the relation between country weight changes and fund country holding returns at the fund country level. In this subsection, we extend the regression analysis to fund stock level, which enables us to control for the stock-level turnover and within-country stock turnover. In Panel A of Table A18, we regress individual stock-holding returns on lagged country weight changes and lagged stock weight changes. We find that stock-level weight changes cannot predict subsequent individual stock-holding returns. After controlling for stock-level turnover, country weight changes can still predict future individual stock returns. In Panel B of Table A18, we regress individual stock-holding returns on lagged country weight changes and lagged within-country stock weight changes. Within-country stock-level weight changes cannot predict subsequent individual stock-holding returns. After controlling for within-country stock-level turnover, country weight changes are still significantly associated with future individual stock returns. Overall, these findings provide additional evidence for the positive relation between country weight changes and performance at the fund stock level, and such a relation is not driven by individual stock-holding level turnover.

VI. Conclusions

Our article investigates whether active international equity mutual funds have the skills to change their country allocations to exploit opportunities and avoid losses in different countries. We build a new measure of what we call a fund's "country rotation intensity" and uncover a reliable positive relation between

country rotation intensity and subsequent return performance. We find that funds sell country holdings ahead of subsequent poor country market returns and currency depreciations.

Our article brings new evidence to the international finance literature. Current papers on international fund skills focus on fund managers having superior information endowments with respect to specific countries and either holding concentrated portfolios or having home ties to such countries (e.g., Choi et al. (2017), Schumacher (2018), and Jagannathan, Jiao, and Karolyi (2022)). Our findings uncover a new source of skill—namely, fund managers' abilities to reallocate assets across different countries around the world in a timely way. Our study also contributes to the market timing literature. There is mixed evidence on whether funds possess market timing skills in domestic markets, particularly in the U.S. executing a successful country rotation strategy requires funds to monitor and time the market returns of many countries, a task far more complex than timing the U.S. market alone. We uncover international funds exhibit downside country market timing abilities. Our measure of country rotation intensity is an intuitive new metric that can help investors in their search for international fund managers with skills. This measure could be disclosed proactively by funds and tracked by fund investors.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109025000055.

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