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Equity Market Integration and Portfolio Rebalancing

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Abstract

This paper studies equity mutual funds' portfolio choices in emerging markets with different degrees of financial market integration. By examining the monthly holdings of 385 mutual funds from 1999 to 2017, we find that these funds generally engage in portfolio rebalancing strategies in response to equity return changes. Moreover, we show that the propensity to rebalance is greater in stock markets that are more financially integrated into the world market. High market liquidity and low regulatory barriers, which characterize financial integration, are found to be important drivers of active rebalancing in emerging markets.

Keywords: Emerging markets; Equity market integration; International portfolio allocation; Mutual funds; Portfolio rebalancing

JEL classification: F32; G11; G15

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1. Introduction

While there is ample evidence of home bias in asset holdings, global financial integration has generally encouraged risk sharing and the diversification potential of international investors.[1] As is widely recognized, this integration process has also contributed to stronger market comovements around the world, potentially influencing the diversification strategies of international investors.

Our focus in this paper is to examine how the evolution of financial integration in emerging markets affects international portfolio investment strategies of advanced country-based mutual funds. Specifically, we aim to answer the following related questions: Do international mutual funds actively respond to the changes in the host country's stock market returns? If so, which strategy, portfolio rebalancing or momentum trading, characterizes their behavior? How do these funds' responses differ across destination countries that have a different degree of equity market integration? Finally, to what extent does the portfolio reallocation strategy depend on fund characteristics and market conditions?

We address these questions applying the portfolio-based techniques of Grinblatt et al. (1995) and Curcuru et al. (2011, 2014) using the monthly portfolio allocation data from 1999 to 2017 provided by the Emerging Portfolio Fund Research (EPFR) database.

We first report statistically significant and robust empirical evidence that there is a negative relationship between the deviation from a buy-and-hold (BH) country weight and the country's realized excess return. When a host country's stock market outperforms the portfolio's average

[1] For a study of the home bias, see French and Poterba (1991), Tesar and Werner (1995), Lewis (1999), Warnock (2002), Karolyi and Stulz (2003), Ahearne et al. (2004), Chan et al. (2005), and Fidora et al. (2007).

return, its share in the mutual fund's portfolio is expected to fall below the passive benchmark on average. This suggests the prevalence of rebalancing strategies of mutual funds for their portfolio holdings in emerging markets. With an actively rebalanced portfolio, fund managers mitigate pass-through from asset returns to country weights and keep the portfolio allocation closer to their target risk exposure over time.

In addition, we show that the extent of rebalancing appears more pronounced in times of stress, especially during major international financial crises, than in normal times. We also observe that U.S. funds, unlike funds located in other regions, often practice positive momentum trading during our sample period. This pattern was not prevalent earlier but has become stronger since 2009.

Furthermore, we find that a host country's stock market integration with the world is positively associated with more aggressive rebalancing by mutual funds. To gain a better understanding of this result, we provide an informal exploration of what channels could drive the more aggressive rebalancing in more financially integrated economies. High market liquidity (representing low transaction costs) and low regulatory barriers, which characterize financial integration, are found to be important drivers of active rebalancing in emerging markets.

This paper adds to the voluminous literature on international portfolio investments along three dimensions. First, our portfolio-based study of mutual funds' trading style contributes to the debate in the literature regarding the various portfolio strategies of international investors. A number of studies, using different types of datasets, find evidence supporting momentum trading strategies.[2] Some recent papers, on the other hand, find portfolio rebalancing to be a dominant

[2] See, for example, Bohn and Tesar (1996), Brennan and Cao (1997), Choe et al. (1999), Froot et al. (2001), Kim and Wei (2002), Borensztein and Gelos (2003), Kaminsky et al. (2004), Richards (2005), Hsieh et al. (2011), and

investment strategy for international equity mutual funds (e.g., Hau and Rey, 2008; Curcuru et al., 2011, 2014) and for individual households in Sweden (Calvet et al., 2009). The reasons for these contradictory findings are due in part to the identification strategies of trading patterns, the choice of source/destination countries and sample periods, and underlying assumptions about asset returns.

Exploiting the mutual funds' actual geographic asset allocation information, we directly examine their trading strategies using portfolio-based techniques. Accordingly, this approach does not suffer from the inference problem associated with the wealth effect plaguing aggregate flow-based analysis.[3] Moreover, unlike Kim and Wei (2002) and Borensztein and Gelos (2003) who use U.S. dollar returns for non-U.S. investors, we denominate total returns from an emerging market in the currency of the fund's domicile. Properly defining the realized returns is important in testing the role of the exchange rate risk in portfolio strategies.[4] Our analysis provides evidence of less aggressive rebalancing for assets held in markets maintaining a hard currency peg. In contrast to Hau and Rey (2008), however, our finding is based on portfolio weight shifts between foreign assets held by purely international mutual funds.

The second contribution of this paper is the introduction of equity market integration as an additional driving force for mutual funds' portfolio allocation behavior. To measure the *de facto* equity market integration across countries, we follow Bekaert and Mehl (2019) in estimating a global beta using a world capital asset pricing model (CAPM).

Jotikasthira et al. (2012).

[3] Since bilateral flows can be influenced by changes in the wealth of underlying investors, a negative relationship between flows and past returns does not necessarily indicate rebalancing (Curcuru et al., 2011, 2014).

[4] Hau and Rey (2008) argue that international fund managers actively rebalance to offset the increased foreign exchange risk due to foreign assets outperforming domestic ones. By contrast, Curcuru et al. (2014) document that past currency movements do not trigger U.S. investors to rebalance their international equity portfolios.

Earlier research on international portfolio choice has emphasized the role of host country-specific market characteristics. These characteristics include the degree of transparency (Gelos and Wei, 2005), dividend tax treatment (Desai and Dharmapala, 2011), exchange rate volatility and local equity market volatility (Thapa and Poshakwale, 2012), information revealed through past FDI flows (Andrade and Chhaochharia, 2010), real GDP growth (Chan et al., 2005; Hsieh et al., 2011), stock market size and liquidity (Aggarwal et al., 2005; Chan et al., 2005; Thapa and Poshakwale, 2012), and transaction costs (Rowland, 1999).[5]

Other studies have underscored the importance of global push factors, such as interest rates, economic growth, industrial production, and liquidity and risk shocks in advanced economies, in analyzing the determinants of capital flows (Calvo et al., 1993; Fernandez-Arias, 1996; Chuhan et al., 1998; Forbes and Warnock, 2012; Fratzscher, 2012; Ghosh et al., 2014). Relative to the existing literature, this paper provides evidence for the impact of financial integration on mutual funds' international portfolio allocation strategies.

Third, deviating from aggregate data-based approaches, this paper also explores the heterogeneous trading behavior of mutual funds across their target regions, domiciles, sizes, and investment types (passive or active). Since the flows of mutual fund money to a country increase as a result of two combined actions − underlying investors' injections into the fund and the fund manager's choice of country weights in the portfolio − understanding funds' trading behavior can

[5] The gravity literature in international finance also suggests the following bilateral factors as important determinants of cross-border equity flows: bilateral trade (Aviat and Coeurdacier, 2007; Lane and Milesi-Ferretti, 2008); the degree of transparency, investor protection, and corruption (Daude and Fratzscher, 2008); exchange rate risk (Fidora et al., 2007); informational frictions (Portes and Rey, 2005); and stock return correlations (Lane and Milesi-Ferretti, 2008; Coeurdacier and Guibaud, 2011; Vermeulen, 2013).

help better identify the drivers of capital flow dynamics. It also helps inform emerging economies on designing effective policies to stabilize their domestic financial markets.

The rest of the paper proceeds as follows. Section 2 presents the empirical methodology. Section 3 describes the data. The empirical results are reported in Section 4, while Section 5 provides the conclusion.

2. Empirical methodology

In this section, we present a standard method to measure active portfolio reallocation strategies and stock market integration and use them to build the baseline regression models.

In reality, different mutual fund managers have different response time intervals. For example, some could manage their portfolios by rebalancing on a monthly basis, while others may do so using longer horizons. Moreover, they may have different minimum thresholds for changes in return and risk characteristics, inducing some fund managers to adjust their portfolios while others remain inactive, even when exposed to return shocks of similar size. For these reasons, our empirical procedure based on a panel dataset seeks to describe the average tendency of funds' reaction to excess return changes.

2.1. Identifying active portfolio adjustments

The most widely used method for identifying portfolio trading strategies is Grinblatt et al. (1995) momentum statistics, which connect portfolio weight changes from date $t-1$ to t with stock return changes from date $t - k$ to $t - k + 1$, where k is a positive integer.[6] They assess whether and to what extent fund managers adjust their portfolio weights in the direction of historical stock returns during the benchmark period.

Curcuru et al. (2011, 2014) refine Grinblatt et al.'s techniques by introducing the excess stock return evaluated relative to the portfolio average return. As a result, this modified measure gives a more accurate picture of active change in the portfolio weight for the country asset whose performance is examined in conjunction with the rest of the portfolio. Moreover, it better reflects the behavior of a standard Markowitz mean-variance investor holding an international portfolio. This paper closely follows the portfolio-based technique of Curcuru et al. (2011, 2014).

When international portfolio returns are realized, they become a basis of the fund manager's reallocation decision. The fund manager can choose one of two actions: passive holding or active reallocation. Certainly, this choice depends on the fund manager's liquidity needs and diversification motives, the required transaction costs, and the underlying assets' expected return and risk, among others.

Let's first define a BH or passive weight using Eq. (1), which is the conditional country j's share if fund i does not trade assets after observing market returns at time t:

$$\left(w_{ij,t}^{\mathrm{BH}} \middle| r_{j,t}, r_{i,t}\right) = w_{ij,t-1}\left(\frac{1+r_{j,t}}{1+r_{i,t}}\right) \tag{1}$$

[6] See Kim and Wei (2002), Borensztein and Gelos (2003), Kaminsky et al. (2004), Hau and Rey (2008), and Curcuru et al. (2011, 2014), who employ the momentum statistic of Grinblatt et al. (1995).

where $w_{ij,t-1}$ is country *j*'s weight in the last period, $r_{j,t}$ is the total return from country *j*'s stock market between $t-1$ and *t*, and $r_{i,t}$ is fund *i*'s weighted average portfolio return, defined as $r_{i,t} = \sum_{j=1}^{J} w_{ij,t-1} r_{j,t}$. Eq. (1) indicates that the BH weight will move in the same direction as country *j*'s realized relative return.

Alternatively, if the fund manager actively alters her portfolio given the return realization, country *j*'s share at time *t* will deviate from the passive weight. In order to capture this active reallocation behavior, we decompose the change of country *j*'s asset share into active and passive components as follows:

$$\Delta w_{ij,t} = w_{ij,t} - w_{ij,t-1}\left(\frac{1+r_{j,t}}{1+r_{i,t}}\right) \tag{2}$$

Note that the second term on the right-hand side of Eq. (2) is the BH weight shown in Eq. (1). Under the passive holding, $\Delta w_{ij,t} = 0$ in Eq. (2). When country *j*'s equity market outperforms fund *i*'s portfolio return, the portfolio weight for country *j* automatically rises due to the valuation gain without any trades actually taking place. Looking at the deviation from the BH weight at time *t*, Eq. (2) allows us to track the fund manager's *active* portfolio management.

2.2. Measuring stock market integration

We now turn our attention to quantifying international stock market integration. There are a few different ways to capture this abstract concept. While cross-country correlations of stock index returns are one of the most widely used indicators of integration, the simple correlation approach has often been criticized for various reasons.

Bekaert and Harvey (1995) argue that due to the different industry mix in a country compared to the average world mix, a perfectly integrated country could exhibit a low return correlation. Instead, they propose time-varying expected returns that arise from changing covariance with a single global factor and examine the extent to which the covariance affects the expected returns to obtain an integration measure. Carrieri et al. (2007) demonstrate, based on an international asset pricing model, that correlations of emerging market index returns with the global market structure consistently underestimate the degree of integration. Pukthuanthong and Roll (2009) note that a country can be strongly integrated even with low correlations. This is due to the presence of multiple global factors. Unless two countries are proportionally susceptible to global influences, their correlation could be low even when the returns of both countries are completely and exclusively driven by the same global common factors.

In this paper, we follow Bekaert and Mehl (2019) and employ conditional betas as a *de facto* measure of equity market integration based on a world CAPM.[7] In order to obtain time-varying dynamics of integration in emerging markets, we use an international factor model with two factors as specified below:

$$R_{j,t} = \beta_{j,t}^{g} f_t^{g} + \beta_{j,t}^{r} f_t^{r} + c_j + \lambda_t + \varepsilon_{j,t} \tag{3}$$

where $R_{j,t}$ is the excess return on the equity index of country *j* in U.S. dollars (over the 3-month U.S. Treasury bill rate in daily units); f_t^{g} and f_t^{r} are value-weighted excess returns on the global

[7] Other approaches to estimate time-varying market integration include those of Hardouvelis et al., (2006), Carrieri et al. (2007), Chambet and Gibson (2008), Pukthuanthong and Roll (2009), Bekaert et al. (2009), and Bekaert et al. (2011).

and regional markets, respectively; c_j is a country-specific constant; λ_t is a time-fixed effect; and $\varepsilon_{j,t}$ is the idiosyncratic shock of market *j*.

The global factor (f_t^g) is calculated using the dollar-denominated daily index returns of the 17 developed economies that are the fund domicile countries in our sample.[8] For regional factor (f_t^r) calculation, we consider three regions: Asia (China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand); Europe, Middle East & Africa (Czech Republic, Egypt, Greece, Hungary, Israel, Kazakhstan, Poland, Romania, Russia, South Africa, and Turkey); and Latin America (Argentina, Brazil, Chile, Colombia, Mexico, and Peru). We make sure to exclude country *j*'s own stock returns when computing the regional market returns. As in Bekaert and Mehl (2019), these regional returns are orthogonalized with respect to the global return before entering the regression in order to clearly distinguish the global financial integration from the regional integration. Although our focus is solely on global integration, it is necessary to give maximum flexibility in the model by including both global and regional factors, as the market integration process may not proceed smoothly (Bekaert et al., 2009).

We estimate the international CAPM model in Eq. (3) using rolling-window regressions between January 4, 1999, and December 29, 2017, with a window size of 12 months. The estimated monthly global betas, $\hat{\beta}_{j,t}^g$, serve as a time-varying indicator of global integration.

Note that the correlation between country and global returns can be expressed as the global beta times the ratio of global to country return volatility, which can increase due to a sharp rise in global factor volatilities during a global crisis and its immediate aftermath. Therefore, estimates

[8] Luxembourg is excluded because its MSCI index information is not available. When the host country is Austria, 16 developed markets' daily stock returns, excluding Austria's, are used to compute the global factor.

of correlation coefficients are likely to be biased upward when global markets are more volatile (Forbes and Rigobon, 2002). However, by design, our beta measure of integration is immune to this volatility bias.

As an illustrative step, Fig. 1 displays the time series plots of integration for six selected countries (see Online Appendix Table A.1 for information about integration for all sample countries). First, despite the increasing degree of globalization in the trade of goods and assets over the past two decades, we do not find an increasing trend in integration in any of the countries in the figure. Instead, integration has gone through large swings over time. Second, global betas show different dynamics across countries during the crisis period (indicated by shaded bars in the graph). For example, the degree of integration tends to decline in Brazil, Malaysia, and Mexico during the global financial crisis, while the opposite pattern is observed in Hungary, Korea, and Russia. In addition, there is a noticeable increase in betas in Brazil and Russia during their recent domestic crises.

Insert Fig. 1 about here.

2.3. Baseline model specifications

Our first baseline model takes the following panel fixed-effect regression form:

$$\Delta w_{ij,t} = \sum_{k=1}^{3} \alpha_k \Delta r_{ij,t-k} + c_{ij} + u_{ij,t} \tag{4}$$

where $\Delta w_{ij,t}$ is a change in fund *i*'s country *j* share at time *t* as defined in Eq. (2); $\Delta r_{ij,t-k}$ (= $r_{j,t-k} - r_{i,t-k}$) is country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of periods by which the returns are lagged (called "relative return" hereafter); c_{ij} controls for a time-invariant fund-host country fixed effect; and $u_{ij,t}$ is a normal i.i.d. error term. The fund-host country fixed effect is necessary to control for mutual funds' persistent preferences for certain countries within their target region.

It is important to use the lagged relative returns in Eq. (4) to avoid finding a spurious contemporaneous relation: in the absence of actual trading, a higher return from country *j* than the fund's average return at time *t* would simultaneously increase both the relative return and the BH weight, mechanically driving the relative return coefficient toward negative values. The lagged returns also help capture the delayed effect of return changes on active portfolio reallocation strategies.

The first objective of our empirical analysis is to estimate the relative return coefficient from Eq. (4) and test for momentum and portfolio rebalancing:

$$\frac{\partial[\Delta w_{ij,t}|\Delta r_{ij,t-k}]}{\partial \Delta r_{ij,t-k}} = \alpha_k \tag{5}$$

A significant and negative coefficient α_k from Eq. (5) would indicate the mutual funds' (lagged) rebalancing or contrarian trading behavior. By contrast, a significant and positive coefficient α_k would represent their (lagged) momentum or positive feedback trading behavior. The momentum trading strategy will benefit the funds if country *j*'s return exhibits an upward trend with little volatility, and its success is largely dependent upon the return predictability. On the other hand, the rebalanced portfolios will neutralize the compounding effect resulting from the country's return changes and keep the portfolio allocation closer to the target risk exposure. For a BH strategy, α_k should be equal to zero. How country weights in international portfolios react to the changes in realized returns will be determined by the prevailing tendency among the mutual funds in our data.

The next objective of our analysis is to examine the degree of country *j*'s global financial integration and its impact on the propensity to rebalance or return-chase. Accordingly, the second baseline model extends Eq. (4) and takes the following interaction variable regression form:

$$\Delta w_{ij,t} = \sum_{k=1}^{3} \alpha_k \Delta r_{ij,t-k} + \sum_{k=1}^{3} \gamma_k \left(\Delta r_{ij,t-k} \times \Delta I_{ij,t-k}\right) + \sum_{k=1}^{3} \theta_k \Delta I_{ij,t-k} + c_{ij} + e_{ij,t} \qquad (6)$$

where $\Delta I_{ij,t-k} \left(= I_{j,t-k} - I_{i,t-k}\right)$ is country *j*'s financial integration at time *t* – *k* relative to the average integration of the host countries in fund *i*'s portfolio, defined as $I_{i,t} = \sum_{j=1}^{J} w_{ij,t-1} I_{j,t}$, and $e_{ij,t}$ is a disturbance term. To ease our interpretation of the parameter estimates, we take a partial derivative of Eq. (6) with respect to the realized relative return:

$$\frac{\partial\left[\Delta w_{ij,t} | \Delta r_{ij,t-k}, \Delta I_{ij,t-k}\right]}{\partial \Delta r_{ij,t-k}} = \alpha_k + \gamma_k \Delta I_{ij,t-k} \qquad (7)$$

Eq. (7) shows that the magnitude of rebalancing (or momentum trading) depends on the strength of country *j*'s relative integration, $\Delta I_{ij,t-k}$.

If the funds' desire is to stay closer to their target allocations by actively realigning the country weights in the portfolio by selling past winners and buying past losers, we would expect a negative coefficient α_k in Eq. (7). Additionally, a negative coefficient γ_k would capture more aggressive rebalancing in a more integrated host market. Conversely, a relative return coefficient α_k would enter Eq. (7) with a positive sign if momentum trading prevailed, and a positive coefficient γ_k would reflect stronger momentum trading in response to increasing market integration.

3. Data

We use the EPFR database, which provides country allocation information of international mutual funds collected directly from fund managers or administrators.[9] Our sample covers 385 equity mutual funds and the period from 1999m12 to 2017m12. The funds in our sample primarily hold foreign assets in emerging market economies, with few to no home assets.

Since our main objective is to analyze changes in financial integration and their impact on institutional investors' trading behavior, the sample includes only emerging market-dedicated funds. Limiting our attention to only emerging market host countries also helps avoid any suspicion that a country weight regressed on the global financial integration is biased by that same country being heavily weighted in the global factor.[10] Moreover, we consider only equity funds to focus on portfolio shifts across countries and exclude the possibility of shifts across asset classes.

[9] There are a few more empirical studies that use the EPFR data but address questions different from ours. These include Borensztein and Gelos (2003), Gelos and Wei (2005), Broner et al. (2006), Wei et al. (2010), Fratzscher (2012), Jotikasthira et al. (2012), Raddatz and Schmukler (2012), and Forbes et al. (2016).

[10] The portfolios of the emerging market funds include few developed host countries (e.g., Austria), as the funds typically invest a small fraction (less than 5%) of their assets outside the target region or in cash. In the unreported exercise that excludes these developed host countries, we find that our main results remain robust.

To build a reliable sample, we use the following screening procedure. We drop funds with less than 12 months of observations. Small funds whose initial net asset value is less than 15 million U.S. dollars are also excluded, as they often report data at less frequent intervals. After implementing these screens, 26 emerging market host countries remain in the sample.

The EPFR database reports each fund's name, total net assets in U.S. dollars, country allocation weights as a percentage of the fund assets, investment destination countries/target regions, investment types (passive or active), and currency denomination. The database also provides information about fund domiciles that are primarily located in advanced economies.

One limitation of this database is that it lacks information on funds' detailed portfolio composition at the security level. Therefore, we implicitly assume that the funds hold a portfolio of stocks that is well approximated by the Morgan Stanley Capital International (MSCI) country index, although this may not be the case in practice.

Table 1 displays a summary of the EPFR data. Funds are different in investment scope and sorted by the fund domiciles and market segments. For example, BRIC funds invest, on average, 35.3% of their assets in China, 25.3% in Brazil, 18.5% in India, 16.8% in Russia, and 2.6% in Hong Kong.

Insert Table 1 about here.

The rest of the data come from various sources. The stock market indices in both daily and monthly time series for each country are from MSCI. The monthly spot exchange rates are from Bloomberg and the Global Financial Database. Using the data, total returns from an emerging stock market are calculated as a sum of the log difference of the local MSCI indices and the log difference of exchange rates (expressed in fund domicile currency per host country currency) over time. Information needed for calculating market capitalization is obtained from the Datastream and CRSP databases.

Table 2 provides summary statistics of the key variables used in our regression analyses. It reports the mean, median, and standard deviation of country weight changes, relative returns, and relative stock market integration in the full sample and in the subsample by various target regions and fund domiciles. Some differences exist in the descriptive statistics for key variables across fund characteristics, motivating the subsample analysis adopted in the next section.

Insert Table 2 about here.

4. Empirical results

4.1. Main results

This subsection presents our main empirical results based on the panel fixed-effect model estimation. Since an increase in a country's weight automatically implies a decrease in the weights of other countries within a portfolio, we employ Driscoll and Kraay (1998) standard errors to account for cross-sectional correlation as well as autocorrelation and heteroskedasticity. Time-invariant unobserved heterogeneity is controlled by fund-destination country fixed effects in all specifications.[11]

[11] A simple destination country fixed effect could capture country-specific unobserved factors to the extent that they do not vary much over time. We find that the results, available in Online Appendix Table A.2, confirm the robustness

Table 3 reports the coefficient estimates of the first baseline regression model, Eq. (4). First of all, column (1) provides statistically significant evidence of portfolio rebalancing at the two- and three-month lags.[12] The insignificant coefficient for the one-month-lagged relative return may reflect that rebalancing reactions are delayed by two months on average. The sum of the significant return coefficients of -0.103 implies that an increase in country *j*'s relative return by one standard deviation (+0.0713) over the last three months is associated with a decrease in the underlying market's portfolio weight below the passive benchmark by 0.007 percentage points in month *t*. This percentage point change is not economically trivial. In fact, it is equivalent to about 617.12 million U.S. dollars in asset sales when applied to the U.S. funds' total net assets in December 2017.

Insert Table 3 about here.

Next, we discuss the estimated coefficients of Eq. (6). Column (2) shows statistically significant evidence of rebalancing, similar to the finding in column (1). In addition, we see that the degree of rebalancing tends to move in tandem with equity market integration. Specifically, given a one-standard-deviation increase in the relative return, a rise in country *j*'s relative integration by one standard deviation (+0.4806) over the past three months would lead to a decline in the underlying market's portfolio weight below the passive benchmark by 0.010 percentage points in month *t*.[13]

of our main findings to this alternative specification.

[12] We tested the lag length up to six and found that the added variables do not have significant coefficients.

[13] Rerunning the baseline regression models on two subsamples, more integrated vs. less integrated, we find consistent

In columns (3) and (4), the specifications also include month-specific time effects to account for any unobserved events and reforms that may have global impacts. The results maintain their sign, although significance patterns in integration interaction variables become slightly weaker.

In addition to individual coefficient estimates and their standard errors, Table 3 also reports F-statistics to test the null hypothesis that the lagged relative return has no effect on the fund's portfolio reallocation behavior in the interaction variable regressions. As seen in Eq. (7), this null hypothesis requires a joint significance test for α_k and γ_k. The p-values for the F-statistics reported in columns (2) and (4) are consistently below 1%, further validating our main empirical specification in Eq. (6).

4.2. Asymmetric responses to bull vs. bear markets

We now consider estimating the main specifications under two different market conditions, when there is a positive or a negative relative return, to examine whether there exists a possible asymmetry in mutual funds' portfolio strategies.

Table 4 displays the results. The empirical evidence in columns (1) and (3) demonstrates that rebalancing is mutual funds' dominant strategy regardless of market conditions. However, when the significant coefficients for lagged rebalancing are summed up over a three-month horizon, the funds show about a 70% stronger reaction when purchasing past losers than when selling past winners.

evidence that the significant integration effect of rebalancing appears only when the relative integration is greater than its median value. This result is available in Online Appendix Table A.3.

Insert Table 4 about here.

Comparing the results in columns (2) and (4), we also find more accentuated rebalancing from an internationally integrated host market only when buying recently falling market shares. It seems that market integration does not significantly affect the funds' portfolio strategies when selling rising market shares. Given that the market liquidity can serve as an important driving force for financial integration (Bekaert et al., 2011), we may relate the findings in column (4) to mutual funds' liquidity preferences in trading stocks (Cao et al., 2013; Huang, 2015).

4.3. Evidence during crisis vs. non-crisis periods

During the sample period, a number of emerging market economies were hit by a series of crises. According to Laeven and Valencia (2013), the dates for systemic banking crises in our sample countries are as follows: Argentina, 2001−2003; Colombia, 1998−2000; Czech Republic, 1996−2000; Indonesia, 1997−2001; Malaysia, 1997−1999; Philippines, 1997−2001; Thailand, 1997−2000; and Turkey, 2000−2001. More recently, Brazil (2014−2016), Greece (2010−2017), and Russia (2014−2015) experienced severe economic downturns due to political uncertainty, a sovereign debt crisis, and a financial crisis, respectively. Furthermore, given the worldwide destructive impact of the global financial crisis that lasted from December 2007 to June 2009 (according to the National Bureau of Economic Research), a majority of emerging economies, as well as developed source countries, were likely to undergo large swings in cross-border capital flows.

During the global financial crisis, in particular, those equity markets that had a strong global connection could have had more volatile local equity returns due to the dramatic market turbulence in advanced economies and its spillover effect. This in turn could damage the portfolio returns of emerging market mutual funds, making their degree of risk-aversion unusually high in the presence of a worldwide contraction of liquidity. Funding shocks from underlying investors and forced liquidations could also be at play.

To examine how the funds' portfolio strategies change when facing large market uncertainty during times of stress, we introduce a crisis dummy variable that controls for the major national and international financial/debt crises listed above.

From the estimation results in column (1) of Table 5, we first note that portfolio rebalancing is a dominant trading strategy during good times, and significantly negative crisis interaction terms indicate that the rebalancing magnitude becomes stronger in bad times. Similarly, the results in column (2) show that the propensity to rebalance from more integrated markets is expected to be greater during times of stress than during normal times. When controlling for all variables together, we find the consistent result in column (3).[14]

Insert Table 5 about here.

4.4. Robustness check accounting for other macroeconomic determinants of portfolio choice

[14] In order to circumvent serious multicollinearity issues in the presence of a large number of highly correlated interaction variables in the model presented in column (3), all crisis interaction variables are orthogonalized with respect to the other regressors before entering the regression.

In this subsection, we introduce other host market conditions and test the robustness of our main results. Missing potentially relevant factors, particularly if they are strongly correlated with the relative return, would make our baseline results biased. Here, we consider the aggregate risk factors such as local equity market risk and exchange rate risk. We also consider a recipient country's output growth to capture its macroeconomic performance.[15]

Before proceeding further, we present the method used to quantify our control variables. Following the definition of relative return, additional variables introduced in this subsection are also computed on a relative scale: if *x* is a variable of interest, we define the deviation of country *j* from fund *i*'s average value of *x* at time *t* as

$$\Delta x_{ij,t} = x_{j,t} - x_{i,t} \tag{8}$$

where $x_{i,t} = \sum_{j=1}^{J} w_{ij,t-1} x_{j,t}$. For example, when assessing market volatility, we first calculate the standard deviation of the daily country index returns within a month, $VOL_{j,t}$. We then obtain relative market volatility $\Delta VOL_{ij,t}$ using Eq. (8). Similarly, we obtain relative output growth, $\Delta Y_{ij,t}$, where a country's growth rate $Y_{j,t}$ is defined as the log difference of quarterly RGDP.

We do not follow the same procedure to measure the currency risk, which is proxied with a binary indicator. The dummy variable $PEG_{j,t}$ takes a value of one if a fund domicile and a host country use the same currency under a fixed exchange rate arrangement with a *de facto* peg or preannounced horizontal band with margins of no larger than ±2% at time *t*.

[15] Gravity-type variables such as geographical distance and common language are unlikely to have a substantive effect on our main findings, which are robust to time-invariant host country fixed effects (see Footnote 11).

The data for RGDP (local currency unit, seasonally adjusted) are taken from the World Bank Global Economic Monitor and IMF International Financial Statistics, and the exchange rate regime fine classification from Ilzetzki et al. (2019).

Table 6 displays the estimation results while controlling for the additional portfolio choice determinants and their interaction with the relative returns. The rebalancing behavior of mutual funds is robust to controlling for the relative market volatility (column 1), the exchange rate risk (column 3), and the relative GDP growth (column 5) of the host countries. Moreover, we verify in columns (2), (4), and (6) that a positive relation still holds between the propensity to rebalance and the extent of integration.

Insert Table 6 about here.

One additional finding is worth noting. The significantly positive coefficient on the first lagged PEG interaction term in column (4) reflects the mutual funds' momentum, rather than contrarian trading for assets held in countries adopting a hard currency peg. Put differently, the absence of exchange rate risk could alleviate the need for rebalancing and even lead to return-chasing behavior. This result provides empirical support for the foreign exchange risk rebalancing hypothesis of Hau and Rey (2008). According to Hau and Rey (2008), mutual funds actively rebalance their portfolios to lessen their exposure to foreign exchange risk when the foreign share of their portfolios gains in value. An important macroeconomic consequence of the rebalancing response is a decrease in the value of foreign currency resulting from sales of foreign assets. This is a primary logic behind the "uncovered equity parity" condition described in Hau and Rey (2006) and Kim (2011).

4.5. Heterogeneity by fund characteristics

The full-sample regression results discussed thus far may hide potential inter-fund variations. Hence, we disaggregate the sample by various fund types and estimate Eqs. (4) and (6) to examine the existence of any heterogeneity across funds. The funds differ by their target region (BRIC, Emerging Europe, Global Emerging, and Latin America), domicile (the Eurozone, Scandinavia, the UK, and the U.S.), size (large vs. small), and investment type (active vs. passive).

Reviewing the estimation results in columns (1), (3), (5), and (7) of Table 7, we find that fund managers react quite differently across target regions. Based on the sum of the significant coefficients for lagged rebalancing over the last three months, the magnitude of rebalancing seems higher in BRIC and Emerging Europe compared to Global Emerging and Latin America. Moreover, as reported in columns (2), (4), (6), and (8), stronger rebalancing in integrated markets is more pronounced from stocks held in BRIC, Emerging Europe, and Latin America than in Global Emerging countries. Indeed, column (6) shows both economically and statistically much weaker evidence of rebalancing from assets held in Global Emerging compared to other target regions.

Insert Table 7 about here.

To help our understanding of the differences in funds' reallocation strategies across target regions, Fig. 2 shows the frequencies of equity market integration falling into each quintile in each target region. The left-skewed histograms for Emerging Europe and Latin America represent that the frequencies of high percentiles (i.e., stronger integration) are greater than those of lower percentiles. In the case of BRIC, the histogram does not display a long tail. Nevertheless, the presence of highly integrated markets such as Brazil and Russia makes the beta distribution of BRIC countries dominated by the highest percentile. By contrast, the histogram for Global Emerging is somewhat right-skewed, increasing funds' exposure to relatively less integrated markets within their portfolios. These differences explain the more pronounced rebalancing behavior with respect to global integration in BRIC, Emerging Europe, and Latin America than in Global Emerging countries.

Insert Fig. 2 about here.

Noticeable heterogeneity is also detected across fund domiciles. From the estimation results in columns (9)−(16) of Table 7, we find strong evidence for portfolio rebalancing from the funds based in the Eurozone, Scandinavia, and the UK, although there is only suggestive evidence for the integration effect of rebalancing among the UK funds. In sharp contrast to the funds in other domiciles, a positively significant coefficient for the one-month-lagged relative return in column (15) suggests momentum trading by the U.S. funds. The same message emerges from the estimation result in column (16): while we find a significantly negative coefficient for the first lagged integration interaction variable, the coefficient size is not large enough to overturn the U.S. funds' momentum trading behavior.

To better understand how the U.S. funds' portfolio adjustment patterns are different from others', we rerun the baseline regression models using the U.S. funds sample across target regions and subsample periods (results available in Online Appendix Tables A.4−A.6). The results show that the U.S. funds' high concentration in the well-diversified Global Emerging target region and the absence of foreign exchange risk for their holdings in hard peg countries might be features encouraging momentum trading.[16] For example, the U.S. funds invest, on average, 12.4% of their assets in China, 1.9% in Malaysia, 1.7% in Hong Kong, 0.7% in Argentina, and 0.5% in Egypt, all of which peg their currencies against the U.S. dollar. The U.S. funds' momentum trading was not prevalent earlier but has become stronger since 2009.

Let's now turn our attention to the heterogeneous rebalancing responses across different fund sizes. From columns (17)−(20) of Table 7, we find that although contrarian trading is a prevailing portfolio strategy regardless of the fund size, the large funds do not account for integration changes in the underlying markets, while the small funds apparently do. One possible reason for this difference is the funds' target region. Evidence from our data reveals that 74% of the large funds (and 53% of the small funds) primarily invest in Global Emerging countries whose concentration in less integrated markets could attenuate the incentive to rebalance.

Lastly, columns (21)−(24) show the results of splitting the sample into different investment types. As expected, active funds are clearly more prone to engaging in rebalancing strategies than their passive counterparts.[17]

4.6. What could drive the integration effect of portfolio rebalancing?

As the final step of the analysis, we provide an informal exploration of what could drive a positive relationship between the degree of equity market integration and the mutual funds'

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[16] About 87% of U.S.-domiciled funds target the Global Emerging market. By contrast, 63% of the UK funds, 52% of the Eurozone funds, and 46% of the Scandinavian funds target Global Emerging.

[17] Reexamining the passive funds subsample at a quarterly frequency to accommodate their relatively infrequent portfolio adjustments, we find statistically significant evidence of rebalancing at the 10% level from more integrated markets at the one-quarter lag. The rest of the variables exhibit no significance, similar to the results in columns (23) and (24) of Table 7.

propensity to rebalance. Specifically, we examine whether the factors that are known to be closely related to financial integration could affect rebalancing behavior on their own. We consider two such factors: market liquidity and regulatory barriers.[18] While these are not an exhaustive list of integration determinants (for relevant discussions, see Bekaert et al., 2011; Lehkonen, 2015; Bekaert and Mehl, 2019), our focus here is to study the most obvious channels that may directly affect the funds' portfolio allocation strategies.

4.6.1. Market liquidity

Since higher market liquidity can represent overall lower transaction costs, international mutual funds may find rebalancing less costly in more liquid emerging stock markets. Supporting this view, Lynch and Balduzzi (2000) show that the presence of realistic transaction costs causes a rebalancing frequency to fall. In a related vein, Clarke et al. (2007) document that liquidity-constrained fund managers tend to respond to redemptions by selling their more liquid assets aggressively.

Using the data from Datastream, we introduce country-level quoted bid−ask spreads and turnover as price- and volume-based proxies for liquidity. Following Chordia et al. (2001), the average monthly proportional bid−ask spread is defined as (Ask – Bid)/((Ask + Bid)/2) for each security and then aggregated to the country level using relative market capitalization as weights.

[18] We have also considered a specification that includes both market liquidity (or regulatory barriers) and financial integration variables at the same time to test whether the former drives out the effect of the latter. Our estimation results, available upon request, support this hypothesis. However, they should be interpreted with caution because the presence of several highly correlated variables may lead to the insignificant coefficients for integration interaction terms.

Similarly, we calculate the monthly turnover series as the number of shares traded for a stock divided by the number of shares outstanding and obtain the country-level measure using value weighting.

If the market is highly liquid, corresponding bid−ask spreads are expected to be small, reflecting low trading costs, while market turnover is expected to be high, reflecting a high trading frequency. In order to ease our interpretation of the estimation results, the bid−ask spread is multiplied by −1 to transform it into a unit increasing with liquidity. These proxies enter the baseline regression in Eq. (6) in place of the integration indicator to test whether they play any significant role in driving portfolio rebalancing processes.

Columns (1) and (2) of Table 8 present the liquidity effect of rebalancing. As expected, we find statistically significant evidence that the funds take a stronger rebalancing strategy with assets held in more liquid emerging markets that generally require lower transaction costs.[19]

Insert Table 8 about here.

The rebalancing motive might come from the interaction between liquidity and risk. The high degree of market liquidity could propagate the firm-specific risk relatively quickly and extensively across local and global financial markets, triggering strong rebalancing responses by mutual funds in integrated markets. Our empirical results support this view: mutual funds tend to

[19] We have also tested the liquidity effect of rebalancing using a zero return-based proxy. The estimation results in Online Appendix Table A.7 yield moderate support for the hypothesis that mutual funds more actively rebalance shares held in more liquid markets (the p-values for the positive second and third lagged zero-return interaction terms are 0.11 and 0.15, respectively).

engage in more active rebalancing in markets with higher stock-level idiosyncratic volatility, and this pattern is stronger in more liquid emerging markets (results available in Online Appendix Table A.8).

4.6.2. Regulatory barriers

A less restricted stock market typically reflects a higher extent of liberalization and financial development, which will attract greater international portfolio flows. In such a market, the lower regulatory barriers can make portfolio rebalancing relatively easier.

In order to test the effect of regulatory constraints on rebalancing, we use the *de jure* capital control index developed by Fernández et al. (2016). This is an updated and extended version of the Schindler (2009) index, which is based on detailed analysis of the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Specifically, we use the average of "purchase locally by nonresidents" and "sale or issue locally by nonresidents" for equities as a relevant measure of legal restrictions on capital flows. The index value of 1 signifies a restriction and 0 no restriction, and it is multiplied by –1 to obtain a measure that increases with capital openness.

A significantly negative coefficient for the first lagged interaction variable in column (3) of Table 8 provides evidence for more pronounced rebalancing in more open equity markets due to their lower regulatory barriers to financial transactions.

5. Conclusion

This paper expands our understanding of the international portfolio allocation strategies of equity mutual funds investing in emerging economies. Using the mutual funds' country allocation data from 1999m12 to 2017m12, we show that the funds engage in rebalancing strategies for their portfolio holdings in emerging markets. In addition, our results indicate that the propensity to rebalance is stronger in bad times, especially during major international financial crises, than in good times. Unlike the funds domiciled in the other regions, the U.S. funds have tended to follow momentum rather than contrarian trading since 2009.

Moreover, we show that a host country's stock market integration with the world is positively associated with more aggressive rebalancing by the mutual funds. To better understand a potential mechanism through which financial integration influences funds' rebalancing behavior, we consider factors that are known to be closely related to integration and may directly affect the funds' portfolio strategies. We find that high market liquidity (representing low transaction costs) and low regulatory barriers are important driving forces behind more pronounced rebalancing in emerging markets.

An interesting extension of this work would be to investigate whether international mutual funds play a stabilizing or destabilizing role in emerging equity markets. The counter-cyclical nature of the portfolio rebalancing might have the potential to lessen the volatility of the emerging stock market. The likelihood of this stabilizing effect would increase with the growing importance of mutual funds accounting for international equity flows.

Conversely, De Long et al. (1990) theoretically show that rational speculators can drive prices away from fundamental values and increase the volatility of asset prices in the presence of positive feedback trading. Jotikasthira et al. (2012) provide empirical evidence supporting this theoretical prediction.

In order to formally test this price pressure hypothesis, it is necessary to understand the patterns of redemption and injection by underlying investors as well as the portfolio allocation strategies of fund managers, as their actions in combination lead to portfolio flow fluctuations. This is beyond the scope of our work, so we leave it for future research.

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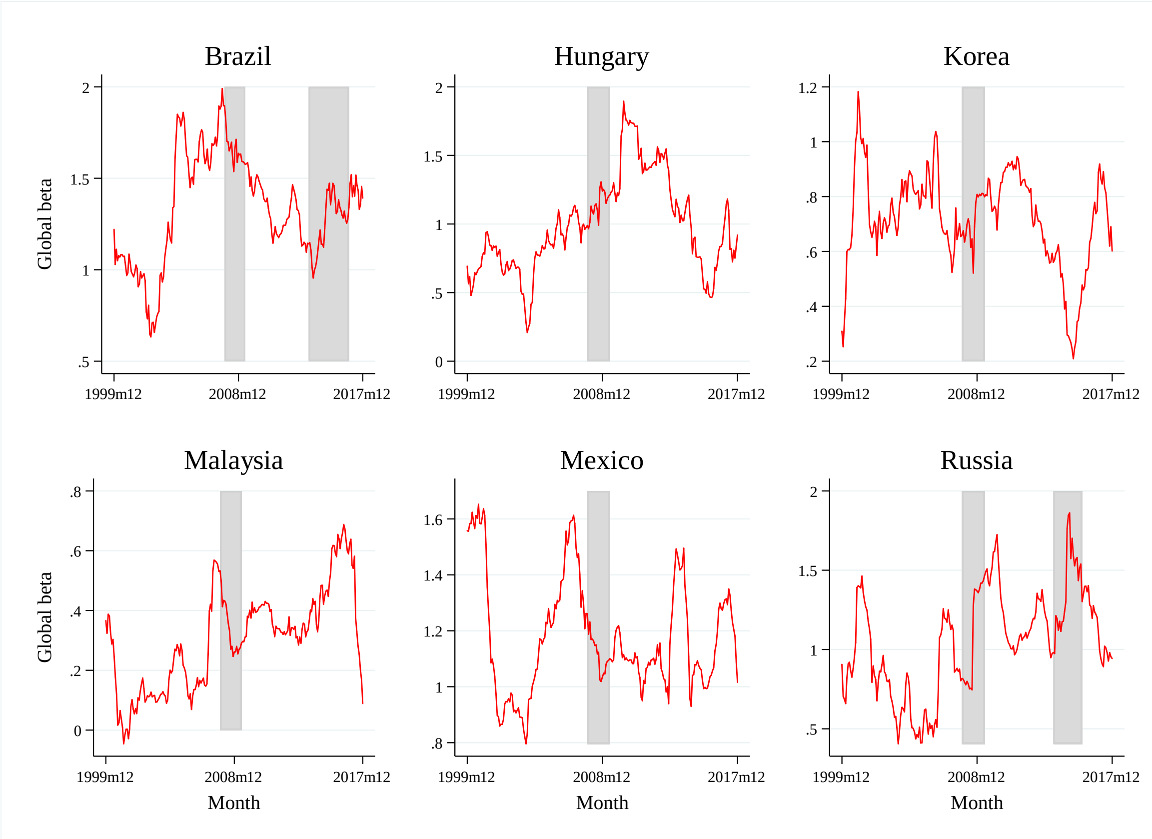

Fig. 1. Time series plots of global equity market integration in selected emerging market economies.

Global beta is a proxy used to measure global equity market integration and is estimated using a world capital asset pricing model. The shaded bars in the graph indicate the global financial crisis (2007m12–2009m6) and national crises in Brazil (2014–2016) and Russia (2014–2015).

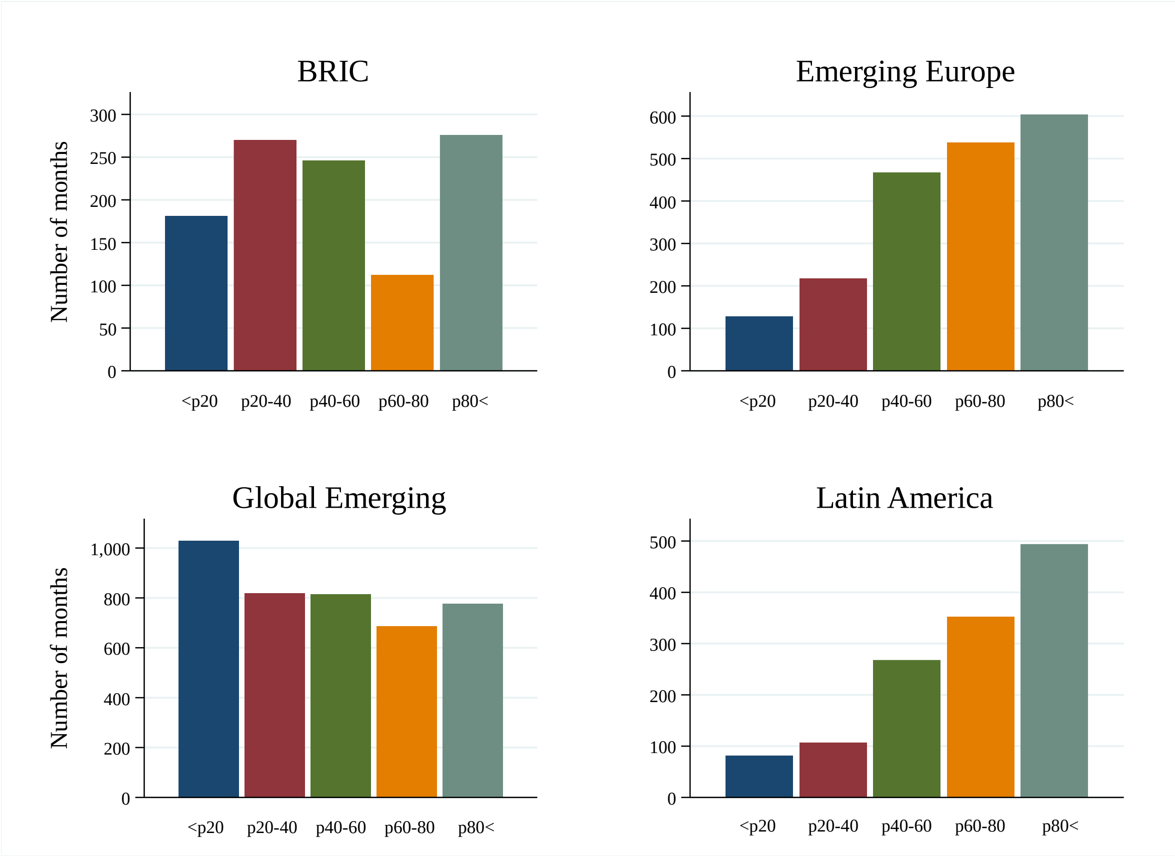

Fig. 2. Distribution of integration across target regions.

Global equity market integration is measured by the estimate of global betas based on a world capital asset pricing model. The figure displays the frequencies of integration in terms of the number of months falling into each quintile in each target region. BRIC refers to Brazil, Russia, India, and China.

Table 1

Snapshot of the EPFR sample.

This table presents detailed information about the EPFR sample data. In Panel A, total net assets (TNA), expressed in U.S. billion dollars, are taken from the observations in December 2017. “Others” in Panel A include the mutual funds domiciled in Denmark, Finland, Italy, and the Netherlands. BRIC refers to Brazil, Russia, India, and China. In Panel B, the country weights are calculated by averaging each fund’s country weights over time and then averaging them across funds for each target region. Country weights greater than 0.5% are reported only. Source: Authors’ calculations based on the EPFR data, 1999m12−2017m12.

A. Number of funds and total net assets by fund domicile and by target region

Fund domicile	No. funds	TNA	Fund target region	No. funds	TNA
Australia	5	369.36	BRIC	17	293.89
Austria	6	11.60	Emerging Europe	73	688.93
Belgium	7	5.92	Global Emerging	233	24,412.19
Canada	9	39.82	Latin America	62	1,507.99
France	8	651.06	Total	385	26,903.00
Germany	2	20.42			
Ireland	32	1,973.96			
Japan	4	30.00			
Luxembourg	137	10,234.72			
Norway	3	547.51			
Sweden	6	333.86			
Switzerland	8	705.30			
United Kingdom	54	3,161.15			
United States	96	8,815.96			
Others	8	2.32			

B. Average country weight (%) by target region

BRIC	Emerging Europe	Global Emerging		Latin America
Brazil (25.3)	Austria (1.3)	Brazil (11.8)	Malaysia (2.3)	Argentina (2.0)
China (35.3)	Czech Rep. (6.2)	Chile (1.0)	Mexico (5.9)	Brazil (55.9)
Hong Kong (2.6)	Greece (0.8)	China (13.8)	Philippines (1.0)	Chile (6.6)
India (18.5)	Hungary (9.0)	Egypt (0.6)	Poland (1.0)	Colombia (1.3)
Russia (16.8)	Kazakhstan (0.7)	Hong Kong (2.2)	Russia (6.2)	Mexico (31.0)
	Poland (17.3)	Hungary (0.9)	South Africa (7.6)	Peru (2.3)
	Romania (0.7)	India (8.3)	Taiwan (9.7)	
	Russia (50.1)	Indonesia (2.5)	Thailand (2.9)	
	Turkey (10.8)	Israel (1.1)	Turkey (2.6)	
		Korea (14.1)		

Table 2

Summary statistics for key variables.

In the table, $\Delta w_{ij,t}$ stands for a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight; $\Delta r_{ij,t}$ for country *j*'s total excess return relative to fund *i*'s portfolio return; and $\Delta I_{ij,t}$ for country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. BRIC refers to Brazil, Russia, India, and China. The Eurozone includes Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, and the Netherlands. Scandinavia refers to Denmark, Norway, and Sweden. Source: Bloomberg, CRSP, Datastream, EPFR, Global Financial Data, and MSCI.

	$\Delta w_{ij,t}$			$\Delta r_{ij,t}$			$\Delta I_{ij,t}$		
	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.
Full sample	6.9×10^{-6}	0	0.4414	-0.0007	-0.0008	0.0713	-0.1309	-0.1636	0.4806
By fund target region									
BRIC	-4.3×10^{-7}	0	0.3625	-0.0013	0.0002	0.0704	-0.0669	-0.1351	0.4582
Emerging Europe	-0.0001	0	0.5338	0.0014	0.0005	0.0779	-0.1936	-0.2223	0.4797
Global Emerging	-1.1×10^{-5}	0	0.4203	-0.0014	-0.0015	0.0667	-0.0116	-0.0616	0.4320
Latin America	0.0002	0	0.3984	-0.0008	-0.0001	0.0770	-0.4489	-0.5096	0.4753
By fund domicile									
Eurozone	2.8×10^{-5}	0	0.4688	-0.0006	-0.0007	0.0722	-0.1485	-0.1807	0.4860
Scandinavia	-0.0003	0	0.3336	-0.0002	4.5×10^{-5}	0.0716	-0.1672	-0.1951	0.4829
United Kingdom	-0.0002	0	0.3897	-0.0006	-0.0007	0.0706	-0.1180	-0.1541	0.4772
United States	0.0001	0	0.4341	-0.0009	-0.0010	0.0688	-0.0659	-0.1037	0.4543
All others	0.0001	0	0.4123	-0.0014	-0.0015	0.0733	-0.2177	-0.2442	0.5015

Table 3
Portfolio rebalancing and the effect of integration: main results.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. Estimations are performed including different combinations of fixed effects indicated in the table. Driscoll-Kraay standard errors are reported in parentheses. *F*-statistics for a Wald test and their significance level are reported to test the joint significance of coefficients for total excess returns and interaction terms. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)
$\Delta r_{ij,t-1}$	**-0.014**	**-0.017**	**-0.016**	**-0.018**
	(0.014)	(0.016)	(0.015)	(0.016)
$\Delta r_{ij,t-2}$	**-0.065*****	**-0.067*****	**-0.068*****	**-0.069*****
	(0.013)	(0.015)	(0.014)	(0.015)
$\Delta r_{ij,t-3}$	**-0.038****	**-0.037***	**-0.042****	**-0.040****
	(0.018)	(0.019)	(0.019)	(0.020)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.041****		**-0.041***
		(0.020)		(0.021)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.033***		**-0.032**
		(0.020)		(0.022)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.016**		**-0.016**
		(0.027)		(0.029)
$\Delta I_{ij,t-1}$		0.039***		0.045***
		(0.012)		(0.013)
$\Delta I_{ij,t-2}$		-0.034***		-0.040***
		(0.012)		(0.014)
$\Delta I_{ij,t-3}$		0.004		0.004
		(0.003)		(0.003)
Fund-country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes
No. observations	688,910	688,910	688,910	688,910
F-statistic		4.96***		4.95***
R-squared	0.012	0.012	0.012	0.013

Table 4

Portfolio rebalancing and the effect of integration: asymmetric responses.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. We report the results with a positive relative return in columns (1) and (2) and a negative relative return in columns (3) and (4).

	Positive relative return: $\Delta r_{ij,t-k} > 0$		Negative relative return: $\Delta r_{ij,t-k} < 0$	
Variable	(1)	(2)	(3)	(4)
$\Delta r_{ij,t-1}$	**-0.011**	**-0.013**	**-0.020**	**-0.023**
	(0.016)	(0.017)	(0.016)	(0.018)
$\Delta r_{ij,t-2}$	**-0.059*****	**-0.062*****	**-0.065*****	**-0.066*****
	(0.014)	(0.016)	(0.015)	(0.016)
$\Delta r_{ij,t-3}$	**-0.027**	**-0.028**	**-0.035****	**-0.034***
	(0.018)	(0.020)	(0.017)	(0.018)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.030**		**-0.047****
		(0.021)		(0.024)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.027**		**-0.032**
		(0.021)		(0.024)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.026**		**-0.014**
		(0.027)		(0.024)
$\Delta I_{ij,t-1}$		0.031***		0.037***
		(0.012)		(0.013)
$\Delta I_{ij,t-2}$		-0.028**		-0.031**
		(0.013)		(0.013)
$\Delta I_{ij,t-3}$		0.006		0.001
		(0.004)		(0.003)
No. observations	608,821	608,821	602,909	602,909
R-squared	0.015	0.015	0.014	0.014

Table 5
Portfolio rebalancing and the effect of integration: normal vs. crisis times.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. Crisis is a dummy variable to control for the global financial crisis (2007m12−2009m6) as well as financial/debt crises in Argentina (2001−2003), Brazil (2014−2016), Colombia (1999−2000), Czech Republic (1999−2000), Greece (2010−2017), Indonesia (1999−2001), Malaysia (1999), Philippines (1999−2001), Russia (2014−2015), Thailand (1999−2000), and Turkey (2000−2001). The table reports coefficient estimates from panel fixed-effect regressions. $\Delta I_{ij,t-k}$ with k = 1, 2, 3 are included in estimations but suppressed to save space. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Variable	(1)	(2)	(3)
$\Delta r_{ij,t-1}$	**0.006**	**-0.016**	**-0.017**
	(0.017)	(0.018)	(0.018)
$\Delta r_{ij,t-2}$	**-0.050*****	**-0.068*****	**-0.067*****
	(0.018)	(0.019)	(0.019)
$\Delta r_{ij,t-3}$	**-0.044*****	**-0.034****	**-0.037****
	(0.014)	(0.016)	(0.016)
$\Delta r_{ij,t-1}$ · Crisis	**-0.069*****		**-0.070****
	(0.027)		(0.029)
$\Delta r_{ij,t-2}$ · Crisis	**-0.051****		**-0.052****
	(0.025)		(0.025)
$\Delta r_{ij,t-3}$ · Crisis	**0.029**		**0.042**
	(0.029)		(0.030)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.036****	**-0.040***
		(0.018)	(0.021)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.035**	**-0.031**
		(0.030)	(0.022)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**0.015**	**-0.019**
		(0.022)	(0.022)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$ · Crisis		**-0.014**	**-0.003**
		(0.051)	(0.055)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$ · Crisis		**0.016**	**0.025**
		(0.052)	(0.054)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$ · Crisis		**-0.105****	**-0.115*****
		(0.043)	(0.044)
No. observations	688,910	688,910	688,910
R-squared	0.012	0.012	0.012

Table 6

Portfolio rebalancing and the effect of integration: controlling for other portfolio choice determinants.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. X represents a different control variable for each regression: $\Delta VOL_{ij,t}$ corresponds to country *j*'s equity market volatility relative to the average volatility of the host countries in fund *i*'s portfolio, and $\Delta Y_{ij,t}$ to relative RGDP growth. $PEG_{j,t}$ is a dummy variable taking a value of one if a fund domicile and a host country use the same currency under a fixed exchange rate arrangement. The table reports coefficient estimates from panel fixed-effect regressions. $\Delta I_{ij,t-k}$ and X_{t-k} with k = 1, 2, 3 are included in estimations but suppressed to save space. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Market volatility $X = \Delta VOL_{ij,t}$		Fixed exchange rate $X = PEG_{j,t}$		RGDP growth $X = \Delta Y_{ij,t}$	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta r_{ij,t-1}$	**-0.008**	**-0.017**	**-0.013**	**-0.021**	**-0.067*****	**-0.071*****
	(0.017)	(0.019)	(0.015)	(0.017)	(0.023)	(0.023)
$\Delta r_{ij,t-2}$	**-0.055*****	**-0.058*****	**-0.060*****	**-0.063*****	**-0.070*****	**-0.078*****
	(0.015)	(0.019)	(0.015)	(0.017)	(0.023)	(0.024)
$\Delta r_{ij,t-3}$	**-0.029***	**-0.036****	**-0.040****	**-0.042****	**-0.021**	**-0.026**
	(0.016)	(0.017)	(0.019)	(0.021)	(0.027)	(0.030)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.048****		**-0.039****		**-0.067***
		(0.022)		(0.020)		(0.038)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.032**		**-0.027**		**-0.121*****
		(0.028)		(0.022)		(0.026)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.027**		**-0.017**		**-0.047**
		(0.026)		(0.028)		(0.049)
$\Delta r_{ij,t-1} \cdot X_{t-1}$		0.845		0.201***		-0.961
		(0.791)		(0.069)		(1.058)
$\Delta r_{ij,t-2} \cdot X_{t-2}$		-0.004		0.029		-1.148
		(1.089)		(0.060)		(1.436)
$\Delta r_{ij,t-3} \cdot X_{t-3}$		1.050		0.122		0.957
		(1.006)		(0.076)		(1.460)
Frequency	Monthly	Monthly	Monthly	Monthly	Quarterly	Quarterly
No. observations	688,910	688,910	635,807	635,807	195,847	195,847
R-squared	0.012	0.013	0.012	0.012	0.048	0.048

Table 7

Portfolio rebalancing and the effect of integration: fund-level heterogeneity.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. BRIC refers to Brazil, Russia, India, and China.

	Fund target region							
	BRIC		Emerging Europe		Global Emerging		Latin America	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta r_{ij,t-1}$	**-0.117***	**-0.120***	**-0.065**	**-0.101***	**0.017**	**0.018**	**-0.011**	**-0.023**
	(0.068)	(0.072)	(0.042)	(0.060)	(0.015)	(0.015)	(0.028)	(0.050)
$\Delta r_{ij,t-2}$	**-0.142*****	**-0.153*****	**-0.132*****	**-0.185*****	**-0.047****	**-0.045****	**-0.009**	**-0.008**
	(0.045)	(0.049)	(0.032)	(0.044)	(0.023)	(0.023)	(0.028)	(0.051)
$\Delta r_{ij,t-3}$	**-0.224*****	**-0.227*****	**0.008**	**0.005**	**-0.035****	**-0.034***	**-0.061****	**-0.101****
	(0.052)	(0.054)	(0.038)	(0.050)	(0.017)	(0.017)	(0.031)	(0.049)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.079**		**-0.166****		**-0.029**		**-0.026**
		(0.128)		(0.081)		(0.030)		(0.050)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.180****		**-0.223*****		**0.032**		**0.001**
		(0.079)		(0.059)		(0.039)		(0.055)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.088**		**-0.029**		**0.025**		**-0.099****
		(0.110)		(0.067)		(0.036)		(0.050)
$\Delta I_{ij,t-1}$		0.049		0.116***		0.012		0.005
		(0.031)		(0.033)		(0.013)		(0.023)
$\Delta I_{ij,t-2}$		-0.054*		-0.118***		-0.002		-0.004
		(0.031)		(0.033)		(0.014)		(0.023)
$\Delta I_{ij,t-3}$		-0.003		0.015***		-0.001		0.0002
		(0.011)		(0.005)		(0.006)		(0.004)
No. funds	17	17	73	73	233	233	62	62
No. observations	29,623	29,623	142,104	142,104	406,454	406,454	110,729	110,729
R-squared	0.009	0.009	0.011	0.011	0.013	0.013	0.013	0.014

Table 7 (continued)

Portfolio rebalancing and the effect of integration: fund-level heterogeneity.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. The Eurozone includes Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, and the Netherlands. Scandinavia refers to Denmark, Norway, and Sweden.

	Fund domicile							
	Eurozone		Scandinavia		United Kingdom		United States	
Variable	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$\Delta r_{ij,t-1}$	**-0.022**	**-0.029**	**-0.127****	**-0.141****	**-0.064****	**-0.063****	**0.086*****	**0.085*****
	(0.022)	(0.026)	(0.065)	(0.079)	(0.026)	(0.026)	(0.027)	(0.027)
$\Delta r_{ij,t-2}$	**-0.070*****	**-0.073*****	**-0.146*****	**-0.167*****	**-0.079*****	**-0.078*****	**-0.021**	**-0.021**
	(0.021)	(0.025)	(0.044)	(0.053)	(0.028)	(0.028)	(0.027)	(0.028)
$\Delta r_{ij,t-3}$	**-0.040****	**-0.041***	**-0.063**	**-0.069**	**-0.032**	**-0.027**	**-0.032**	**-0.029**
	(0.020)	(0.023)	(0.051)	(0.058)	(0.026)	(0.025)	(0.028)	(0.029)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.058****		**-0.089**		**-0.019**		**-0.061***
		(0.029)		(0.089)		(0.038)		(0.036)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.029**		**-0.121***		**-0.003**		**-0.063**
		(0.027)		(0.069)		(0.044)		(0.040)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.030**		**-0.045**		**0.032**		**-0.021**
		(0.037)		(0.081)		(0.036)		(0.047)
$\Delta I_{ij,t-1}$		0.037**		0.031		0.047**		0.029
		(0.017)		(0.045)		(0.020)		(0.020)
$\Delta I_{ij,t-2}$		-0.033*		-0.027		-0.055**		-0.010
		(0.017)		(0.044)		(0.022)		(0.022)
$\Delta I_{ij,t-3}$		0.004		0.010		0.010**		-0.008
		(0.003)		(0.015)		(0.005)		(0.011)
No. funds	196	196	13	13	54	54	96	96
No. observations	353,049	353,049	22,403	22,403	116,522	116,522	151,888	151,888
R-squared	0.014	0.014	0.015	0.015	0.011	0.011	0.010	0.010

Table 7 (continued)

Portfolio rebalancing and the effect of integration: fund-level heterogeneity.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. In columns (17)−(20), a fund is classified as "large" ("small") if the average value of its total net assets during the sample period is greater (less) than the sample median value of 346.54 million U.S. dollars. In columns (21)−(24), a fund is classified as "passive" if it is an index fund. The non-index funds are classified as "active".

	Fund size				Investment type			
	Large funds		Small funds		Active funds		Passive funds	
Variable	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
$\Delta r_{ij,t-1}$	**-0.013**	**-0.013**	**-0.016**	**-0.021**	**-0.014**	**-0.016**	**-0.063**	**-0.058**
	(0.019)	(0.020)	(0.025)	(0.025)	(0.015)	(0.017)	(0.045)	(0.048)
$\Delta r_{ij,t-2}$	**-0.065*****	**-0.064*****	**-0.065*****	**-0.071*****	**-0.065*****	**-0.068*****	**-0.023**	**-0.018**
	(0.020)	(0.022)	(0.020)	(0.028)	(0.014)	(0.016)	(0.039)	(0.042)
$\Delta r_{ij,t-3}$	**-0.063*****	**-0.061*****	**-0.013**	**-0.011**	**-0.039****	**-0.038****	**0.004**	**0.006**
	(0.019)	(0.020)	(0.020)	(0.021)	(0.017)	(0.019)	(0.039)	(0.044)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.039**		**-0.043***		**-0.040****		**-0.030**
		(0.033)		(0.025)		(0.020)		(0.048)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.019**		**-0.047**		**-0.034**		**-0.038**
		(0.033)		(0.032)		(0.022)		(0.062)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.025**		**-0.002**		**-0.017**		**0.007**
		(0.030)		(0.024)		(0.027)		(0.065)
$\Delta I_{ij,t-1}$		0.041***		0.036**		0.039***		0.028
		(0.014)		(0.017)		(0.012)		(0.023)
$\Delta I_{ij,t-2}$		-0.037**		-0.032*		-0.035***		-0.014
		(0.015)		(0.017)		(0.013)		(0.025)
$\Delta I_{ij,t-3}$		0.003		0.005		0.004		-0.001
		(0.005)		(0.003)		(0.003)		(0.017)
No. funds	141	141	244	244	371	371	14	14
No. observations	354,672	354,672	334,238	334,238	677,920	677,920	10,990	10,990
R-squared	0.006	0.006	0.016	0.016	0.012	0.012	0.016	0.016

Table 8

Portfolio rebalancing and the effect of market liquidity/regulatory barriers.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. X represents a different control variable for each regression: $\Delta SPD_{ij,t}$ corresponds to country *j*'s bid−ask spread relative to the average bid−ask spread of the host countries in fund *i*'s portfolio (multiplied by −1 to transform it into a unit increasing with liquidity), $\Delta TO_{ij,t}$ to relative market turnover, and $\Delta KC_{ij,t}$ to relative capital control (multiplied by −1 to transform it into a unit increasing with capital openness). The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Bid−Ask spread $X = \Delta SPD_{ij,t}$	Turnover $X = \Delta TO_{ij,t}$	Capital control $X = \Delta KC_{ij,t}$
Variable	(1)	(2)	(3)
$\Delta r_{ij,t-1}$	**-0.006**	**-0.009**	**0.007**
	(0.017)	(0.020)	(0.021)
$\Delta r_{ij,t-2}$	**-0.071*****	**-0.088*****	**-0.098****
	(0.017)	(0.019)	(0.046)
$\Delta r_{ij,t-3}$	**-0.040*****	**-0.043****	**-0.011**
	(0.013)	(0.020)	(0.024)
$\Delta r_{ij,t-1} \cdot X_{t-1}$	**0.556**	**-0.205**	**-0.126****
	(0.350)	(0.257)	(0.055)
$\Delta r_{ij,t-2} \cdot X_{t-2}$	**-0.591****	**-1.002*****	**0.023**
	(0.271)	(0.232)	(0.084)
$\Delta r_{ij,t-3} \cdot X_{t-3}$	**-0.768***	**-0.165**	**0.078**
	(0.440)	(0.369)	(0.064)
X_{t-1}	-0.042	-0.086**	0.016**
	(0.047)	(0.040)	(0.007)
X_{t-2}	0.070*	0.078*	0.005
	(0.040)	(0.045)	(0.010)
X_{t-3}	-0.009	0.009	0.024**
	(0.080)	(0.048)	(0.010)
Frequency	Monthly	Monthly	Annual
No. observations	648,087	648,087	39,619
R-squared	0.013	0.013	0.194

Online Appendix

“Equity Market Integration and Portfolio Rebalancing”

Table A.1

Global equity market integration for each country.

Global equity market integration is measured by the estimate of global betas based on a world capital asset pricing model. The figures in column (1) are calculated by averaging the monthly integration measures over the sample period for each country. Columns (2)–(6) report the frequencies of integration in terms of the number of months falling into each quintile.

	Integration					
Country	Average	<p20	p20-40	p40-60	p60-80	p80<
	(1)	(2)	(3)	(4)	(5)	(6)
Argentina	1.129	0	14	16	85	102
Austria	0.980	10	39	16	67	85
Brazil	1.337	0	0	2	34	181
Chile	0.731	0	18	158	41	0
China	0.569	13	118	82	4	0
Colombia	0.643	61	55	61	18	22
Czech Republic	0.700	30	33	88	65	1
Egypt	0.073	214	3	0	0	0
Greece	0.942	0	9	100	68	40
Hong Kong	0.430	133	33	46	5	0
Hungary	0.988	4	13	46	92	62
India	0.558	34	99	81	3	0
Indonesia	0.498	52	104	54	7	0
Israel	0.620	88	51	21	6	51
Kazakhstan	0.535	48	49	37	0	83
Korea	0.719	12	45	100	43	17
Malaysia	0.304	166	35	16	0	0
Mexico	1.178	0	0	2	85	130
Peru	0.910	20	20	29	89	59
Philippines	0.269	170	43	4	0	0
Poland	1.013	0	1	46	104	66
Romania	0.639	22	48	57	7	83
Russia	1.047	1	20	35	66	95
South Africa	1.081	0	0	26	108	83
Taiwan	0.467	77	94	31	15	0
Thailand	0.492	51	136	23	5	2
Turkey	1.028	13	5	42	68	89

			Percentiles				
	Mean	S.D.	1%	25%	50%	75%	99%
Full sample	0.7407	0.4213	-0.0709	0.4354	0.6831	1.0379	1.7906

Table A.2

Portfolio rebalancing and the effect of integration: controlling for country of destination.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. Estimations are performed including different combinations of fixed effects indicated in the table. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta r_{ij,t-1}$	**-0.019**	**-0.022**	**-0.021**	**-0.023**	**-0.021**	**-0.023**
	(0.016)	(0.018)	(0.017)	(0.019)	(0.017)	(0.019)
$\Delta r_{ij,t-2}$	**-0.069*** **	**-0.073*** **	**-0.073*** **	**-0.075*** **	**-0.073*** **	**-0.074*** **
	(0.015)	(0.017)	(0.016)	(0.018)	(0.016)	(0.018)
$\Delta r_{ij,t-3}$	**-0.042****	**-0.041****	**-0.045****	**-0.045****	**-0.046****	**-0.044****
	(0.018)	(0.019)	(0.018)	(0.019)	(0.018)	(0.019)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.046****		**-0.047****		**-0.047****
		(0.021)		(0.022)		(0.021)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.039***		**-0.038**		**-0.038**
		(0.023)		(0.025)		(0.025)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.019**		**-0.018**		**-0.019**
		(0.025)		(0.027)		(0.027)
$\Delta I_{ij,t-1}$		0.038***		0.045***		0.047***
		(0.012)		(0.013)		(0.013)
$\Delta I_{ij,t-2}$		-0.037***		-0.043***		-0.042***
		(0.012)		(0.014)		(0.014)
$\Delta I_{ij,t-3}$		0.003		0.003		0.003
		(0.004)		(0.004)		(0.004)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes	Yes
Fund fixed effects	No	No	No	No	Yes	Yes
No. observations	688,910	688,910	688,910	688,910	688,910	688,910
R-squared	0.001	0.001	0.001	0.001	0.001	0.001

Table A.3

Portfolio rebalancing and the effect of integration: more integrated vs. less integrated.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. We report the results with the relative integration greater than its median value in columns (1) and (2) and smaller than or equal to its median value in columns (3) and (4).

	More integrated: $\Delta I_{ij,t-k} > \text{median}(\Delta I_{ij,t-k})$		Less integrated: $\Delta I_{ij,t-k} \leq \text{median}(\Delta I_{ij,t-k})$	
Variable	(1)	(2)	(3)	(4)
$\Delta r_{ij,t-1}$	**-0.031**	**-0.007**	**-0.001**	**0.046**
	(0.025)	(0.031)	(0.015)	(0.043)
$\Delta r_{ij,t-2}$	**-0.088*****	**-0.092*****	**-0.040****	**-0.079***
	(0.026)	(0.029)	(0.016)	(0.043)
$\Delta r_{ij,t-3}$	**-0.061*****	**-0.072*****	**-0.013**	**-0.008**
	(0.019)	(0.021)	(0.020)	(0.035)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.098****		**0.080**
		(0.049)		(0.067)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**0.039**		**-0.063**
		(0.038)		(0.052)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**0.062**		**0.009**
		(0.052)		(0.042)
$\Delta I_{ij,t-1}$		0.046***		0.020
		(0.014)		(0.015)
$\Delta I_{ij,t-2}$		-0.029*		-0.049**
		(0.015)		(0.024)
$\Delta I_{ij,t-3}$		0.003		0.010
		(0.004)		(0.016)
No. observations	374,708	374,708	314,202	314,202
R-squared	0.020	0.020	0.029	0.029

Table A.4

The U.S. funds' portfolio reallocations and the effect of integration: across target regions.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country *j*'s stock market integration relative to the average integration of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. BRIC refers to Brazil, Russia, India, and China.

	Fund target region							
	BRIC		Emerging Europe		Global Emerging		Latin America	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta r_{ij,t-1}$	**0.228***	**0.259****	**-0.128**	**-0.233**	**0.116*****	**0.118*****	**-0.041**	**-0.121**
	(0.132)	(0.128)	(0.228)	(0.294)	(0.024)	(0.024)	(0.065)	(0.135)
$\Delta r_{ij,t-2}$	**0.135**	**0.158**	**-0.169**	**-0.342**	**-0.013**	**-0.010**	**0.017**	**0.055**
	(0.098)	(0.102)	(0.153)	(0.228)	(0.029)	(0.029)	(0.068)	(0.130)
$\Delta r_{ij,t-3}$	**-0.248****	**-0.271****	**-0.013**	**-0.019**	**-0.026**	**-0.022**	**-0.063**	**-0.142**
	(0.100)	(0.102)	(0.176)	(0.210)	(0.025)	(0.026)	(0.061)	(0.104)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$		**-0.413***		**-0.462**		**-0.063**		**-0.161**
		(0.223)		(0.325)		(0.043)		(0.163)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$		**-0.418****		**-0.735****		**-0.031**		**0.079**
		(0.168)		(0.346)		(0.046)		(0.146)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$		**-0.038**		**-0.015**		**-0.009**		**-0.181**
		(0.119)		(0.216)		(0.062)		(0.120)
$\Delta I_{ij,t-1}$		0.008		0.137		0.025		-0.039
		(0.116)		(0.106)		(0.023)		(0.055)
$\Delta I_{ij,t-2}$		-0.084		-0.104		-0.007		0.053
		(0.092)		(0.110)		(0.025)		(0.054)
$\Delta I_{ij,t-3}$		-0.008		-0.001		-0.007		-0.006
		(0.010)		(0.042)		(0.013)		(0.021)
No. funds	2	2	5	5	83	83	6	6
No. observations	2,376	2,376	8,393	8,393	130,223	130,223	10,896	10,896
R-squared	0.012	0.014	0.006	0.006	0.011	0.011	0.015	0.016

Table A.5

The U.S. funds' portfolio reallocations and the effect of integration: positive relative returns.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund i's country j share at time t measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country j's total excess return relative to fund i's portfolio return, with k being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country j's stock market integration relative to the average integration of the host countries in fund i's portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. The table reports only the results with a positive relative return (i.e., $\Delta r_{ij,t-k} > 0$).

A. Time-varying evidence of portfolio reallocations

Variable	2000-02 (1)	2003-05 (2)	2006-08 (3)	2009-11 (4)	2012-14 (5)	2015-17 (6)
$\Delta r_{ij,t-1}$	**0.121**	**-0.094**	**0.131**	**0.193****	**0.253*****	**-0.012**
	(0.084)	(0.085)	(0.134)	(0.080)	(0.064)	(0.052)
$\Delta r_{ij,t-2}$	**0.006**	**-0.151***	**-0.092**	**0.026**	**0.134*****	**-0.029**
	(0.100)	(0.087)	(0.151)	(0.047)	(0.047)	(0.047)
$\Delta r_{ij,t-3}$	**-0.0002**	**0.028**	**-0.054**	**0.017**	**-0.029**	**0.007**
	(0.088)	(0.081)	(0.079)	(0.072)	(0.042)	(0.044)
No. observations	16,811	19,886	17,856	21,991	29,052	28,427
R-squared	0.033	0.026	0.030	0.031	0.037	0.046

B. Time-varying evidence of portfolio reallocations and the effect of integration

Variable	2000-02 (1)	2003-05 (2)	2006-08 (3)	2009-11 (4)	2012-14 (5)	2015-17 (6)
$\Delta r_{ij,t-1}$	**0.133**	**-0.143**	**0.117**	**0.190****	**0.235*****	**0.022**
	(0.099)	(0.130)	(0.140)	(0.081)	(0.063)	(0.054)
$\Delta r_{ij,t-2}$	**-0.028**	**-0.240****	**-0.148**	**0.031**	**0.128*****	**-0.022**
	(0.112)	(0.121)	(0.181)	(0.052)	(0.045)	(0.046)
$\Delta r_{ij,t-3}$	**-0.036**	**0.023**	**-0.098**	**0.018**	**-0.028**	**-0.012**
	(0.096)	(0.099)	(0.093)	(0.072)	(0.042)	(0.043)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$	**0.081**	**-0.243**	**-0.051**	**-0.041**	**0.068**	**-0.284*****
	(0.142)	(0.222)	(0.129)	(0.095)	(0.088)	(0.059)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$	**-0.139**	**-0.324***	**-0.286**	**0.032**	**-0.010**	**-0.078**
	(0.139)	(0.182)	(0.238)	(0.085)	(0.064)	(0.061)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$	**-0.157**	**0.023**	**-0.316****	**0.110**	**-0.057**	**0.054**
	(0.244)	(0.111)	(0.140)	(0.075)	(0.054)	(0.070)
$\Delta I_{ij,t-1}$	-0.291***	0.203***	0.055	0.081*	-0.062	0.052*
	(0.088)	(0.076)	(0.050)	(0.049)	(0.045)	(0.030)
$\Delta I_{ij,t-2}$	0.260***	-0.138*	-0.119*	-0.056	0.103*	-0.021
	(0.085)	(0.080)	(0.069)	(0.054)	(0.056)	(0.031)
$\Delta I_{ij,t-3}$	0.047	-0.063**	0.014	0.002	0.0003	0.007
	(0.031)	(0.025)	(0.036)	(0.019)	(0.022)	(0.015)
No. observations	16,811	19,886	17,856	21,991	29,052	28,427
R-squared	0.034	0.027	0.031	0.031	0.037	0.047

Table A.6

The U.S. funds' portfolio reallocations and the effect of integration: negative relative returns.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund i's country j share at time t measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country j's total excess return relative to fund i's portfolio return, with k being the number of months by which the returns are lagged. $\Delta I_{ij,t-k}$ represents country j's stock market integration relative to the average integration of the host countries in fund i's portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. The table reports only the results with a negative relative return (i.e., $\Delta r_{ij,t-k} < 0$).

A. Time-varying evidence of portfolio reallocations

Variable	2000-02 (1)	2003-05 (2)	2006-08 (3)	2009-11 (4)	2012-14 (5)	2015-17 (6)
$\Delta r_{ij,t-1}$	**0.155****	**-0.169**	**0.021**	**0.125****	**0.221*****	**-0.010**
	(0.075)	(0.111)	(0.103)	(0.063)	(0.062)	(0.046)
$\Delta r_{ij,t-2}$	**0.067**	**-0.221****	**-0.130**	**-0.012**	**0.087***	**-0.029**
	(0.103)	(0.095)	(0.125)	(0.053)	(0.050)	(0.045)
$\Delta r_{ij,t-3}$	**0.027**	**-0.050**	**-0.091**	**-0.023**	**-0.080**	**0.041**
	(0.087)	(0.099)	(0.069)	(0.071)	(0.049)	(0.043)
No. observations	16,889	19,083	18,025	22,688	28,320	28,391
R-squared	0.033	0.030	0.037	0.032	0.033	0.051

B. Time-varying evidence of portfolio reallocations and the effect of integration

Variable	2000-02 (1)	2003-05 (2)	2006-08 (3)	2009-11 (4)	2012-14 (5)	2015-17 (6)
$\Delta r_{ij,t-1}$	**0.163***	**-0.232**	**0.037**	**0.119***	**0.200*****	**0.024**
	(0.088)	(0.155)	(0.103)	(0.063)	(0.063)	(0.044)
$\Delta r_{ij,t-2}$	**0.030**	**-0.281****	**-0.144**	**-0.012**	**0.080**	**-0.015**
	(0.115)	(0.135)	(0.138)	(0.057)	(0.050)	(0.040)
$\Delta r_{ij,t-3}$	**-0.007**	**-0.063**	**-0.110**	**-0.022**	**-0.081***	**0.027**
	(0.092)	(0.116)	(0.073)	(0.069)	(0.049)	(0.043)
$\Delta r_{ij,t-1} \cdot \Delta I_{ij,t-1}$	**-0.006**	**-0.327**	**0.115**	**-0.161***	**-0.001**	**-0.197*****
	(0.118)	(0.240)	(0.119)	(0.088)	(0.097)	(0.065)
$\Delta r_{ij,t-2} \cdot \Delta I_{ij,t-2}$	**-0.175**	**-0.268**	**-0.055**	**-0.057**	**-0.030**	**-0.042**
	(0.174)	(0.237)	(0.187)	(0.078)	(0.081)	(0.067)
$\Delta r_{ij,t-3} \cdot \Delta I_{ij,t-3}$	**-0.171**	**-0.062**	**-0.119**	**0.070**	**-0.070**	**0.087**
	(0.244)	(0.145)	(0.102)	(0.113)	(0.073)	(0.069)
$\Delta I_{ij,t-1}$	-0.301***	0.138**	0.043	0.077	-0.104**	0.061*
	(0.100)	(0.069)	(0.059)	(0.057)	(0.046)	(0.033)
$\Delta I_{ij,t-2}$	0.261**	-0.093	-0.118**	-0.072	0.181***	-0.036
	(0.132)	(0.093)	(0.060)	(0.061)	(0.056)	(0.037)
$\Delta I_{ij,t-3}$	0.037*	-0.043	0.016	0.005	-0.033*	-0.000
	(0.022)	(0.050)	(0.031)	(0.022)	(0.017)	(0.016)
No. observations	16,889	19,083	18,025	22,688	28,320	28,391
R-squared	0.034	0.031	0.037	0.032	0.034	0.052

Table A.7

Portfolio rebalancing and the effect of market liquidity: using zero-return proportion.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund *i*'s country *j* share at time *t* measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country *j*'s total excess return relative to fund *i*'s portfolio return, with *k* being the number of months by which the returns are lagged. ZR is a proxy for illiquidity measured by the ratio of the number of zero-return days to the number of trading days in each month (source: Lee, 2011). $\Delta ZR_{ij,t-k}$ represents country *j*'s zero-return proportion relative to the average zero-return proportion of the host countries in fund *i*'s portfolio. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, *, and $^{+}$ indicate statistical significance at the 1%, 5%, 10%, and 15% levels, respectively.

Variable	(1)
$\Delta r_{ij,t-1}$	**-0.040**
	(0.033)
$\Delta r_{ij,t-2}$	**-0.107***
	(0.031)
$\Delta r_{ij,t-3}$	**-0.041**
	(0.040)
$\Delta r_{ij,t-1} \cdot \Delta ZR_{ij,t-1}$	**-0.182**
	(0.187)
$\Delta r_{ij,t-2} \cdot \Delta ZR_{ij,t-2}$	**0.301**$^{+}$
	(0.188)
$\Delta r_{ij,t-3} \cdot \Delta ZR_{ij,t-3}$	**0.205**$^{+}$
	(0.142)
$\Delta ZR_{ij,t-1}$	-0.072
	(0.044)
$\Delta ZR_{ij,t-2}$	0.183***
	(0.044)
$\Delta ZR_{ij,t-3}$	-0.012
	(0.027)
No. observations	226,663
R-squared	0.023

Table A.8

Portfolio rebalancing and the effect of idiosyncratic risk: more vs. less liquid markets.

The dependent variable is $\Delta w_{ij,t}$, which captures a change in fund i's country j share at time t measured by the deviation from the buy-and-hold weight. $\Delta r_{ij,t-k}$ represents country j's total excess return relative to fund i's portfolio return, with k being the number of months by which the returns are lagged. The stock-level idiosyncratic volatility for country j at time t, $IV_{j,t}$, is defined as the value-weighted average of the standard deviation of the residuals obtained from regressions of daily individual stock returns on market returns (source: Hanselaar et al., 2019). $\Delta IV_{ij,t}$ corresponds to country j's idiosyncratic volatility relative to the average idiosyncratic volatility of the host countries in fund i's portfolio. A market is classified as "more liquid" if $\Delta SPD_{ij,t-k} > \text{median}(\Delta SPD_{ij,t-k})$ and "less liquid" otherwise, with $\Delta SPD_{ij,t}$ being country j's relative bid−ask spread (multiplied by -1 to transform it into a unit increasing with liquidity). Likewise, a market is considered to be "more liquid" if $\Delta TO_{ij,t-k} > \text{median}(\Delta TO_{ij,t-k})$ and "less liquid" otherwise, with $\Delta TO_{ij,t}$ being country j's relative stock market turnover. The table reports coefficient estimates from panel fixed-effect regressions. All specifications include fund-country fixed effects. Driscoll-Kraay standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. We report the results with the relative market liquidity greater than its median value in columns (1) and (3) and smaller than or equal to its median value in columns (2) and (4).

Liquidity proxy	Bid−Ask spread		Turnover	
	More liquid	Less liquid	More liquid	Less liquid
Variable	(1)	(2)	(3)	(4)
$\Delta r_{ij,t-1}$	**0.012**	**-0.052***	**-0.045**	**0.045**
	(0.035)	(0.029)	(0.032)	(0.029)
$\Delta r_{ij,t-2}$	**-0.116*** **	**0.010**	**-0.109*** **	**-0.017**
	(0.035)	(0.026)	(0.035)	(0.036)
$\Delta r_{ij,t-3}$	**-0.079** **	**-0.069** **	**-0.067** **	**-0.131*** **
	(0.032)	(0.034)	(0.028)	(0.025)
$\Delta r_{ij,t-1} \cdot \Delta IV_{ij,t-1}$	**-0.086*** **	**-0.056**	**-0.077*** **	**-0.079***
	(0.024)	(0.036)	(0.027)	(0.043)
$\Delta r_{ij,t-2} \cdot \Delta IV_{ij,t-2}$	**-0.019**	**-0.115*** **	**-0.087*** **	**-0.010**
	(0.034)	(0.039)	(0.024)	(0.044)
$\Delta r_{ij,t-3} \cdot \Delta IV_{ij,t-3}$	**-0.087*** **	**-0.018**	**-0.068** **	**-0.038**
	(0.026)	(0.036)	(0.027)	(0.045)
$\Delta IV_{ij,t-1}$	-0.012***	-0.004	-0.011***	-0.010**
	(0.004)	(0.004)	(0.004)	(0.004)
$\Delta IV_{ij,t-2}$	-0.006	0.010**	0.001	-0.0001
	(0.004)	(0.005)	(0.005)	(0.003)
$\Delta IV_{ij,t-3}$	-0.002	-0.007*	-0.004	-0.005*
	(0.003)	(0.004)	(0.004)	(0.003)
No. observations	223,968	135,705	218,312	141,361
R-squared	0.022	0.037	0.023	0.033

Table A.9

Countries with a hard currency peg.

This table lists countries with a currency peg against the U.S. dollar or the euro during our sample period. The period of hard pegs is selected based on the fine classification (code < 5) of Ilzetzki et al. (2019). The exchange rate regime data are available until December 2016.

Country	Period of pegs	Anchor currency
Argentina	1999m12-2001m11	US dollar
Austria	1999m12-2016m12	Euro
China	1999m12-2005m7	US dollar
Egypt	1999m12-2001m1	US dollar
Greece	1999m12-2016m12	Euro
Hong Kong	1999m12-2016m12	US dollar
Malaysia	1999m12-2005m6	US dollar
Romania	2012m12-2016m12	Euro

Online Appendix References

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