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ON THE INTERNATIONAL TRANSMISSION OF SHOCKS: MICRO-EVIDENCE FROM MUTUAL FUND PORTFOLIOS

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ABSTRACT

This paper uses micro-level data on mutual funds from different financial centers investing in equity and bonds to study how investors and managers behave and transmit shocks across countries. The paper finds that the volatility of mutual fund investments is driven quantitatively by both the underlying investors and fund managers through (i) injections/redemptions into each fund and (ii) managerial changes in country weights and cash. Both investors and managers respond to country returns and crises and adjust their investments substantially, for example, generating large reallocations during the global crisis. Their behavior tends to be pro-cyclical, reducing their exposure to countries during bad times and increasing it when conditions improve. Managers actively change country weights over time, although there is significant short-run pass-through from returns to these weights. Consequently, capital flows from mutual funds do not seem to have a stabilizing role and expose countries in their portfolios to foreign shocks.

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1. Introduction

The global financial crisis of 2008-2009 reignited the interest in the behavior of financial intermediaries in both propelling risk taking and propagating shocks across markets and countries. In fact, several papers argue that financial intermediaries were at the core of the global financial crisis, as well as in some of the previous crises in emerging economies. In particular, the literature stresses that market participants tend to take too much risk during good times, and run and retrench when shocks hit the financial system.[1] Countries and companies facing short-term or foreign currency debt, or simply depending on volatile foreign financing, are then susceptible to shocks and can become financially constrained as liquidity in the financial system dries up.

In a world where most savings are intermediated, two types of market participants become essential to understand the behavior of financial institutions when investing domestically and globally: (i) the underlying investors delegating their assets to financial intermediaries and (ii) the managers allocating those assets. In the case of investments abroad, investors tend to channel the bulk of their assets through financial intermediaries dedicated to investing across countries, pouring funds into those institutions when they wish to diversify globally and withdrawing their funds when they favor local assets. Managers, in turn, need to deal with these shocks from investors and other shocks by deciding how much cash to accumulate and in which countries to

[1] See Allen and Gale (2000, 2007), Chang and Velasco (2001), Cifuentes et al. (2005), Diamond and Rajan (2005), Rajan (2005), Calomiris (2008), Broner et al. (2010, 2011), Forbes and Warnock (2010), Milesi-Ferretti and Tille (2010), and Gourinchas and Obstfeld (2011), among many others.

invest. The shocks managers face can be large. For example, during the 1998 Russian crisis and the 2008-2009 global crisis, financial institutions faced severe liquidity shortages and withdrawals from the underlying investors, leading to the collapse of Long-Term Management Company (LTCM), Bear Stearns, and Lehman Brothers, and pushing the entire world financial system to the brink of a meltdown.

The link between the underlying investors and fund managers, partly driven by limited information and principal-agent problems, is important because it can profoundly affect portfolio allocations by financial institutions. This link exists because managers are monitored by investors (and their own supervisors) and respond to the incentives that the monitoring imposes on them. The relation between managers and investors is perhaps more obvious in the case of demandable debt that affects banks and bond mutual funds (among others), where short-term rollover decisions by investors are strategic complements and condition managers that are involved in maturity transformation.[2] Bank runs are a good example of this since the incentives to run are correlated among depositors, given that their demandable claims (whose value is fixed in nominal terms) are returned on a first-come, first-served basis (Diamond and Dybvig, 1983). The maturity mismatch and the possibility of a run constitute a source of fragility as liquidity may suddenly vanish (Brunnermeier, 2009; Shin, 2009; Raddatz, 2010; and Gorton and Metrick, 2011). Vulnerability can be exacerbated under the

[2] More specifically, when one investor withdraws financing, banks and bond mutual funds are more likely to run into trouble. Thus, other things equal, other investors have more incentives to withdraw financing as well. In this sense, the decisions by investors are strategic complements (Bulow et al., 1985).

presence of leverage, where margin calls can also trigger collapses.[3] But fragility can exist even in the case of demandable equity (characteristic of mutual funds), where the value of the claims move in tandem with the value of the assets so the rush to get out first is attenuated. For instance, if investors have asymmetric information and flows to mutual funds are related to past returns, sudden collapses in returns can generate fire sales by investors (Shleifer and Vishny, 1997), which accentuate the collapse in returns resulting in further liquidations. This serial correlation of returns resulting from funds selling assets at distressed prices provides incentives for investors to sell their claims as soon as possible (before prices continue declining) and may result in run-like behavior. The fact that investors can pull out their demandable (debt or equity) claims can generate incentives for managers to avoid long-run arbitrage opportunities, herd, and deviate from the optimal portfolios for the underlying investors (Scharfstein and Stein, 1990 and Stein, 2005, 2009). In the case of mutual funds, open-end structures allow investors to monitor managers on a short-term basis and discipline them if they behave badly, but this short-run monitoring can impose limits to arbitrage, as managers are constrained to take long-run positions. For example, managers might not buy assets at fire-sale prices during crises, which are likely to pay off in the long run, since they can suffer short-term withdrawals from the underlying investors. Agency problems might thus lead to short-term structures, vulnerability, fire sales by investors and managers, and contagion effects.

[3] See, for example, Calvo (2002), Kodres and Pritsker (2002), Mendoza and Smith (2006), and Mendoza (2010).

While the literature argues that the supply side of funds and, in particular, the actions of managers and investors are important in the transmission of shocks, detailed and direct evidence on how financial intermediaries behave in their international investments is rather limited. Some papers analyze the case of bank flows, whereas others study mutual fund flows across countries.[4] Although very informative about the behavior of institutional investors, these studies tend to focus on aggregate investment flows into different countries (using bank flows, foreign direct investment, and portfolio flows). Therefore, they mostly miss important micro aspects of the inner-workings of financial institutions, like how fund managers and the underlying investors behave, which seem essential to understand how financial intermediaries invest and react to shocks. These reactions seem to be at the core of the transmission of crises. Three exceptions that stand out and are good complements to this paper are Kaminsky et al. (2004), Hau and Rey (2008), and Jotikasthira et al. (2009).[5]

[4] See, for example, Borensztein and Gelos (2003), Martinez Peria et al. (2005), Broner et al. (2006), Hau and Rey (2006), Cetorelli and Goldberg (2011), and Fratzscher (2011).

[5] Kaminsky et al. (2004) study momentum trading by investors and managers of Latin American equity funds during the Asian crisis. Hau and Rey (2008) use data on equity funds to study whether foreign exchange and equity risk measures trigger rebalancing behavior at the fund and stock level. Jotikasthira et al. (2009) analyze how the movements in outside investor flows force significant changes in the fund portfolio allocations to emerging markets that drive emerging market equity returns, correlations among emerging markets, and the betas of emerging markets on developed markets. A much larger literature studies other aspects of the behavior of mutual funds, at the domestic or international level. See, for example, Grinblatt et al. (1995), Wermers (1999), and Gompers and Metrick (2001) for the U.S. domestic funds, and Kang and Stulz (1997), Dahlquist and Robertsson (2001), Kim and Wei (2002), Chan et al. (2005), Gelos and Wei (2005), and Didier et al. (2010) for the international ones.

In this paper, we use a micro-level dataset on international mutual funds to shed new light on how investors and managers react to shocks and might help transmit them across countries. International mutual funds are particularly useful as they enable us to separately analyze: (i) injections/redemptions, driven by the underlying investors; (ii) fund portfolios or country weights, which are at the sole discretion of managers; and (iii) their interactions (how investors monitor managers).[6] The main data consist of portfolio weights and assets invested in each country around the world for 1,076 equity and bond mutual funds on a monthly basis during 15 years, January 1996 and November 2010. The data cover portfolio allocations to 124 developed and emerging markets and cash, plus fund returns, which allow us to obtain injections and redemptions into each fund.

With the assembled dataset, we study the contribution of the underlying investors and managers to the transmission of shocks and crises, with special attention to the global financial crisis. We explore several related questions of interest. How volatile is the mutual fund investment across countries? Do mutual funds help transmit crises, as the literature has argued for financial intermediaries? What was their specific behavior during the global crisis? More generally, what is the role of investors and managers? How volatile are injections? To what extent do weights remain constant over time? To the extent that weights change, how much are they the cause of valuation effects versus actual buying/selling in different countries or regions? How long does it take for weights to adjust to shocks? How are cash positions used? Are there differences

[6] Henceforth, we often use the term "injections" to refer to injections/redemptions, with the understanding that redemptions correspond to negative injections.

between bond and equity funds? Lastly, how much of the volatility of capital flows is driven by the behavior of the underlying investors and how much by the behavior of mutual fund managers? Are capital flows and retrenchments largely driven by flows into and out of investment funds that lead them to liquidate positions across countries to maintain portfolio weights, or by active changes in these country weights by fund managers?

The main results of the paper can be summarized as follows. Mutual fund assets fluctuate substantially and pro-cyclically over time. Both the underlying investors and managers are behind these movements, retrenching from countries in bad times and investing more in good times. In the case of the underlying investors, wealth effects (driven by shocks at home) seem to have a direct impact on how much they invest in other countries. When shocks are correlated across countries, like during the global crisis, they do not act as deep-pocket international investors buying assets abroad at fire-sale prices. The investor behavior exerts pressure on managers, who need to react to this pressure as well as to shocks to returns (or valuation effects). In the short run, managers allow shocks to returns to pass-through to country weights, with the latter changing substantially over time. Over the long run, weights deviate from the pass-through effects. While during normal times managers do not allow the pass-through to be complete (in relative terms they reallocate a small fraction to countries that are doing badly), they behave pro-cyclically during crises, moving away from countries experiencing turmoil. This pro-cyclicality is observed particularly in equity funds.

Managers of bond funds hold a larger cash cushion, which allows them to better absorb shocks. The behavior of managers and investors has a direct effect on capital flows to countries around the world. In sum, neither managers nor investors seem to be exploiting potential long-term arbitrage opportunities by being contrarian, especially during crises, and exerting a stabilizing role. Instead, they seem to amplify crises and transmit shocks across countries. The global crisis was a notable example of this type of behavior.

Our findings are relevant to different strands of the theoretical literature in both international finance and finance. First, the results in this paper suggest that the demandability of assets plays an important role in the reactions of investors, and is a factor that cannot be neglected in future models of crises. We show that investors run even from equity claims, not just from debt claims. This could be explained, for example, by autocorrelation in returns or wealth effects coming from the investors' home country. Moreover, a run by certain investors might trigger runs by other investors, perhaps because of asymmetric information or because flows are related to past returns.

Second, the findings in this paper also contribute and provide evidence to the theoretical literature that discusses whether the open-end and closed-end structure of mutual funds matter. Our results from open-end funds indicate that when shocks are correlated across countries, like during the global crisis, managers do not act as deep-pocket international investors buying assets abroad at fire-sale prices. The behavior of

investors exerts pressure on managers. The evidence is, thus, consistent with the theoretical literature that argues that in open-end structures neither managers nor investors act counter-cyclically, trying to benefit from potential long-term arbitrage opportunities, and thus performing a stabilizing role. Instead, they seem to amplify crises and transmit shocks across countries, which is also consistent with the large contagion literature.[7]

Third, the findings also relate to the literature that discusses how different types of shocks trigger crises. There is an extensive literature on the origins and propagation of financial crises, and a growing literature on the global financial crisis that tries to understand why a relatively small shock in the U.S. subprime sector resulted in a global recession and the near collapse of many financial institutions and markets. Several papers in this literature conclude that financial institutions play an important channel of the transmission of shocks across countries, producing large fluctuations in capital flows.[8] In this paper, we show micro-evidence that suggests that shocks to the supply side of funds seem important in the transmission and amplification of shocks. With the data we use, we are able to measure different effects inside financial intermediaries, which other papers that focus on capital flows (aggregate or by type) cannot do, despite the increasing interest in financial intermediaries in the transmission of crises. In particular, we measure the shocks faced by managers investing internationally and the

[7] See, for example, Kaminsky and Reinhart (2000), Claessens and Forbes (2001), Boyer et al. (2006), and Mendoza and Quadrini (2010).

[8] See, for example, Shiller (2008), Eichengreen et al. (2009), Hellwig (2009), and Mishkin (2011).

way they respond to those shocks. Namely, we disentangle the actions of investors injecting and withdrawing capital from open-ended funds, possibly as a way to discipline managers, and the behavior of managers actively allocating country portfolios and reacting to shocks from investors and returns. Our results support the claims that shocks to financial institutions and their inner-workings are important to understand crises.

Fourth, there is an increasing interest in studying how portfolios are managed when investing around the world and how shocks impact them. Important among shocks are valuation effects.[9] One advantage of working with mutual fund data is that we can work with actual portfolios. This is helpful because, while there is much discussion on portfolio reallocations, there is limited information on how portfolios are allocated and managed. There are no data on the portfolios of households and little data on those of other institutions like banks and hedge funds. Moreover, unlike country portfolios, the data we use are not inferred from capital flow data. In our case, we link movements in asset allocations to capital flows by an important group of foreign portfolio investors, international mutual funds. Moreover, we analyze in detail what role valuation effects play in changes in portfolio compositions.

The rest of the paper is organized as follows. Section 2 briefly describes the data and provides some basic statistics of the mutual fund investments across countries. Section 3 discusses the shocks to managers and studies the variation in fund allocations

[9] See, for example, Broner et al. (2006), Gourinchas and Rey (2007a), Hau and Rey (2008), Krugman (2008), Devereux and Yetman (2010), and Gourinchas et al. (2010).

(the manager's decisions). Section 4 analyzes how managers and investors react to crises. Section 5 studies how the variations in the investor and manager responses affect capital flows to different countries. Section 6 concludes.

2. Data and Summary Statistics

In this paper, we use a micro-level dataset consisting of an unbalanced panel of 1,140 international equity mutual funds and 121 international bond funds, containing the monthly country portfolios of these funds over the period December 1995 to November 2010 for equity funds and July 2002 to November 2010 for bond funds. The dataset comes from EPFR Global and includes active and dead cross-regional and regional equity and bond funds registered in various domiciles globally. These funds invest in over 124 developed and developing economies around the world. For each fund and month, the dataset contains the total net asset (TNA) value of the fund denominated in U.S. dollars, the percentage of the fund assets allocated to each country (which we refer as *country weights* or *weights*), and the percentage held in cash. The dataset has actively and passively managed funds with different investment scopes: global, emerging markets and different regional funds (Table 1). The data also contain information on the fund domicile, the family (investment or asset management company), and main currency denomination.[10] We generally use the term "fund type" to refer to any of these dimensions of fund characteristics, clarifying the precise dimension when necessary.

[10] Our sample covers mainly open-end mutual funds. While EPFR Global data contain some closed-end funds, their importance is relatively small. Moreover, many of the closed-end funds they cover allow for

To perform the empirical analysis, we cleaned the original data in standard ways, reducing the sample in about 15% and the total of funds to 1,076 starting in 1996.[11] The final dataset on country allocations contains 7,429,000 observations of the investments of the included mutual funds across countries and time. There are substantially more data (cross sectional and time series) and variety of funds for equity funds than for bond funds. For this reason, we place somewhat more weight on the results using equity funds.[12]

We complement the analysis by collecting additional data from other sources aimed mainly at computing inflows and outflows to funds and countries. To calculate monthly injections into each fund, we collect data on fund prices (Net Asset Values, NAVs) from Bloomberg and Datastream that we match to the corresponding funds from EPFR Global by name and family. We are able to match about 90% of the funds in our cleaned sample, ending up with 896 and 106 equity and bond funds, respectively, with

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monthly or quarterly subscriptions and redemptions, and are therefore not truly closed. There is also flow activity due to share buybacks or distributions being taken in cash.

[11] We conducted two basic cleanings. First, we removed fund-time periods where the data was reported at a frequency other than monthly. This excludes some funds that report quarterly data during part of the sample period. Second, we excluded funds that report data for less than 12 months in the entire sample (unless they are present until the end of the sample period).

[12] Equity mutual funds cover the period January 1996 to November 2010 and contain nine types of funds (of global and regional nature). There are a total of 965 mutual funds with 6,867,500 usable observations. Instead, bond mutual funds cover the period July 2002 to November 2010, encompass two types of funds (global and global emerging markets), and include a total of 111 mutual funds. The total number of observations (country weights and cash) for bond funds is 561,500.

return data.[13] The analyses in the paper that require fund return information are restricted to this subset of funds.

Since we do not know the detailed portfolio of each fund within a country, we use country-level indexes to compute returns and assume throughout the paper that all funds investing in a country experience the same return to their investments in that country, disregarding country-return heterogeneity across funds.[14] To this end we collect monthly, dividend-adjusted price indexes in U.S. dollars for stock markets (MSCI Standard Index, S&P Broad Market Index, and local sources for a total of 86 countries) and bond markets (JP Morgan sovereign bond index for 78 countries).[15] Analyses that require country-return information are restricted to those countries and time-periods for which we could gather these data.

Table 1 shows the characteristics of the cleaned mutual fund sample (without constraining by return price availability). Panel A reports sample characteristics by

[13] Information on ISIN is not available for the EPFR Global mutual funds, so we had to match the return data with the EPFR Global data according to the mutual fund name and family, using an algorithm that compares the (Levenshtein) distance across names (which takes into account the minimum number of insertions, deletions, or substitutions necessary to change one string into the other). We then manually screen out incorrect matches and complete the matching process. This procedure yields 896 matches for equity funds and 106 matches for bond funds (over 90% of the sample). The total number of observations of fund prices is 255,510.

[14] We believe this is a reasonable approximation given the documented synchronicity of returns across assets within countries, especially in developing countries (Morck et al., 2000). Furthermore, we find a strong correlation between the return of a fund computed directly from its NAV and the return computed from the portfolio of country investments and country-level returns, which gives additional validity to our approximation.

[15] The time coverage is January 1999-November 2010 for stock market indexes and July 2002-November 2010 for bond market indexes. The total number of observations of stock and bond market indexes across countries and over time is 23,272.

equity/bond funds. There are 965 equity funds (85% of the entire original sample) from January 1996 to November 2010, with a median number of 47 observations per fund. The total number of bond funds is 111 (92% of the entire original sample), covering the period July 2002 to November 2010, with a median number of 34 observations per fund. Panel B reports the number of funds and observations by different partitions. Of the total sample, 95% is actively managed and the rest is passively managed. Also, almost 65% of the funds have their investment scope in Asia (excluding Japan), global markets, global emerging markets, or Europe. Finally, Table 1 documents the number of funds and observations by domicile. The funds are primarily domiciled in developed market jurisdictions, in fact, 80% of the funds are domiciled (in order of importance by the number of funds) in Luxembourg, the U.S., the U.K., and Ireland. Appendix Table 1 classifies funds by mutual fund family. Average total net assets (first computed within funds, and then across all funds) is around 620 million U.S. dollars for both equity and bond funds. Appendix 1 provides more description of the data and some investment patterns.

Figure 1 shows the evolution of total net assets (TNAs) in equity and bond funds by region. Panel A plots total assets for equity funds between January 1996 and December 2000 and between June 2001 and November 2010.[16] Panel B displays total assets for bond funds between July 2002 and November 2010. The figure shows not only

[16] The division between both time frames in equity funds is an important one due to the relevance of global equity funds. EPFR Global starts reporting information for global equity funds in June 2001. The introduction of this type of funds adds nearly 90,000 million U.S. dollars to the total assets in all equity funds.

the large increase in total assets over time, but also the sharp declines around crises, particularly around the Asian and Russian crises and the global financial crisis. A similar pattern is observed for bond funds. The figure also shows that, as a group, bond funds are much smaller than equity funds (100 versus 599 billion U.S. dollars in November 2010), even though the mean fund is of a similar size.

It is interesting to observe not only the variation in TNAs but also that of country weights, for which we focus on the period around the global financial crisis. Figures 2 and 3 show the weights for equity and bond funds, respectively, with global funds at the top and global emerging funds at the bottom. The figures illustrate the evolution of weights for some of the main regions of investment within emerging and developed countries. In particular, they show the weights in: (i) emerging economies (emerging Asia, emerging Europe, and Latin America), developed Europe, and North America for global funds and (ii) emerging Asia, emerging Europe, and Latin America for global emerging funds. The figures also mark some of the main events around the global crisis: the nationalization of Northern Rock, the collapses of Bear Stearns and Lehman Brothers, and the AIG near-collapse.

Figures 2 and 3 show several noteworthy features of the data. First, weights fluctuate substantially over time. Second, there are significant reallocations across regions especially at times of stress. For example, the figures for equity funds show that, even though the epicenter of the crisis was in the U.S., managers started liquidating their exposure to emerging economies after the collapse of Bears Stearns while they

increased their exposure to North America. This is consistent with a relatively smaller collapse in some asset prices in the U.S. than, for instance, in emerging Asia. Only in early 2009 managers started reversing that trend. Among global emerging funds, managers sold their positions in emerging Europe and Latin America and moved to emerging Asia. For example, between June 2008 and July 2009 the mutual fund exposure in Asia increased from 45% to 55%, while it decreased from 14% to 9% in emerging Europe (after having dropped to 7%) and from 24% to 21% in Latin America. Among bond funds, the large substitution took place between developed Europe and North America in global funds, when managers reduced their exposure to Europe from 51% in March 2008 to 31% in November 2008 and increased their share in North America from 7% to 19% during the same period. Global emerging funds sold their positions in emerging Europe and bought assets in emerging Asia after August 2008.

Figure 4 shows a similar plot but for cash positions, which increased for equity funds in the buildup to the crisis and started declining sometime after the collapse of Lehman Brothers. Bond funds show more variation in their cash positions before the crisis, with global bond funds reducing their holdings and global emerging bond funds increasing them. Nonetheless, bond funds quickly reduced their cash positions after the collapse of Lehman.

3. Shocks to Managers and Portfolio Reallocations

Mutual fund managers decide on the allocation of the funds they manage, but the size of these funds depends on the returns of their previous investments and the injection (redemptions) of flows into (out of) the fund. While the return of a fund depends on its past investments, the exact realization of the return is stochastic and can be considered as a shock to the fund manager. Similarly, while the performance of a fund may affect its injections and redemptions, ex-post these inflows and outflows are at the discretion of the underlying investors and largely outside the control of managers.

Mutual fund assets fluctuate importantly. The median growth rate of assets across equity funds fluctuates between -30% and 20%, with a time average of 0.35% and a standard deviation of 7.44% (Figure 5). Fluctuations in the median growth rate of assets are somewhat smaller among bond funds, moving between -20% and 10% (time average and standard deviation of 1.09% and 3.70%, respectively). Table 2 shows interesting variation in the growth rate of assets of funds specialized in different regions/segments. Among equity funds, those specialized in the group called emerging Europe, Middle East, and Africa and in that called emerging Europe experience the highest growth in assets and the highest variability of this growth. On the contrary, funds specialized in Europe experience the lowest growth rate of assets. Similarly, among bond funds the highest growth rates (and highest standard deviations) occur for global emerging funds. Thus, at the TNA level, the data show a shift in favor of developing countries during the period of analysis. The evolution of the median growth

of assets of mutual funds is characterized by lengthy periods of expansion followed by shorter periods of sharp contractions that roughly coincide with periods of international financial turmoil. For instance, equity fund assets experienced large declines in 1997-1998, 2001, and 2008. Because of sample restrictions, among bond funds we only observe the drop in assets in 2008.

Fund assets may grow because of higher returns of their investments or because of injections to the fund by the underlying investors. In fact, the growth rate of fund i's total assets, $\hat{A}_{it}$, can be trivially written as

$$\hat{A}_{it} = r_{it} + f_{it}, \tag{1}$$

where r_{it} is the (net) return to fund i at time t, and $f_{it} = F_{it}/A_{it-1}$ is the injection to the fund (F_{it}) expressed as a fraction of the fund's initial assets (A_{it-1}). While injections are not directly observable, we can estimate them. To do so, we compute individual fund returns on a given month and obtain injections from the difference between the change in total net assets and individual returns. More formally,

$$F_{it} = A_{it} - A_{it-1}R_{it}, \tag{2}$$

where R_{it} is the gross rate of returns to fund i at time t, computed as P_{it}/P_{it-1}, with P_{it} being the fund price or NAV, adjusted by dividend payments.[17]

[17] A fund's net asset value (NAV) corresponds to the total net assets (A_{it}) divided by the number of shares (N_{it}). Thus, the ratio of NAV in two consecutive periods correspond to the ratio of the total asset values times the inverse ratio of total shares $NAV_{it}/NAV_{it-1} = (A_{it}N_{it-1})/(A_{it-1}N_{it})$. The flows into the fund can also be expressed as the increase (decrease) in shares times the value of the share $F_{it} = (N_{it} - N_{it-1})A_{it-1}R_{it}/N_{it-1}$. Replacing this in Equation (2), we obtain that the gross returns correspond to the ratio of net asset values. The only caveat to our calculation is that total net assets discount the value of a fund's liabilities, such as the fees paid to the managers. However, if these fees are proportional to the

The evolution of the returns and injections for the median fund is shown in Figure 5, Panels B and C, while summary statistics are reported in Table 2. For the median equity and bond funds, both returns and injections experience significant fluctuations. Fluctuations in fund returns are much more volatile than those in injections for equity funds (standard deviations of 6.23% and 2.05%, respectively), while for bond funds the volatility of these components is similar (standard deviations of 2.53% and 2.05%, respectively). This is consistent with equity returns being more volatile than those of fixed income securities (Schwert, 1989; Andersen et al., 2007). Both components also exhibit a similar time pattern, which also coincides with that of the growth rate of assets, suggesting that the components do not cancel each other. Both returns and injections expand during good times and experience severe contractions during periods of financial turmoil. Across types of funds by target region, the most salient pattern is the large growth in injections to funds specialized in BRICs.

The relative variability of returns and injections for equity and bond funds can also be used to explain the variance of the growth rates of assets within funds. Among equity funds, the variances of returns and injections explain roughly the same fraction of the variability of the growth rate of assets (Table 2, Panel A). On average, the variances of returns and injections explain, respectively, 47% and 53% of fund asset

assets under management they would only bias the levels of the variables but cancel out when computing the returns and flows relative to initial assets.

growth variability.[18] Among bond funds, however, the volatility of injections is behind most of the overall variability in asset growth, explaining 89% of it. These results show that price fluctuations are important drivers of the variation of the gross asset positions of investors, especially in equity, which is consistent with valuation effects having potentially important consequences for movements in net foreign asset positions too (Gourinchas and Rey, 2007b).

The variance decompositions reported above consider the whole period with available data. However, it is possible that the contributions of returns and injections vary between tranquil and crisis periods. This is indeed the case. Table 3 shows that return variability plays a much more important role during crisis times. For instance, during the global crisis the contribution of return variability to overall variance of equity funds is 67%, compared to a 37% contribution in the four years leading to the beginning of the crisis. Table 3, Panel B also shows that among bond funds, the contribution of return variability increases from 12% prior to the crisis to 19% during the crisis. These broad patterns tend to be relatively stable across fund types and crises.

The previous results show that, at the fund level, both returns and injections contribute to the variability of asset growth. They also show that returns and injections vary over time in a manner that is consistent with the international business cycle. As

[18] Following Klenow and Rodriguez-Clare (2005), we have equally imputed the covariance term to each component (returns and injections). That is, the share of the variance of the growth of assets explained by returns equals the ratio of the variance of returns plus the covariance between returns and injections to the variance of the growth of assets. The contemporaneous covariance between returns and injections is small and negative.

said above, both returns and injections show sharp drops during times of financial turmoil, and lengthy expansions during tranquil times. It is, therefore, possible that the ability of returns and injections to explain variations in assets comes mainly from all these series sharing a common time component, but this is not the case, especially for injections. While a common time component can explain 59% and 20% of the variability of fund returns (for equity and bond funds, respectively), the same component explains only 5% and 9% of the variability of injections.[19]

A fund manager's main decision is how to allocate his available funds across the different assets in which he may invest, in particular across the countries where the fund specializes. This decision may be driven by long-run structural factors behind the fund's strategic asset allocation (expected returns, covariance of assets across countries, benchmarks being followed, and so forth), but it may also depend on short-run variations in these or other factors. Faced with shocks to the return of their investments or to injections by the underlying investors, fund managers may or may not decide to reallocate their investments within and across countries. This is important because weights that are relatively stable imply that only fluctuations in fund assets (either because of returns or injections) will impact capital flows. On the other hand, country weights that experience non-trivial fluctuations over time indicate that manager decisions, on how to let weights adjust to relative price changes or how to buy and sell assets differentially in different countries, play a role in international capital flows.

[19] These figures correspond to the overall R^2 of an ordinary least squares regression between each of these variables and a set of month fixed effects.

Appendix 2 shows that country weights indeed fluctuate significantly across funds and over time. Next, we study in more detail the behavior of injections and weights.

4. Behavior of Investors and Managers

The evidence above shows that both the underlying investors and managers change their positions over time, but tells us little about the ultimate determinants of mutual fund investments across countries. For instance, it does not show us how investors and managers respond to crises and shocks. These responses are crucial to understand if this type of financial intermediaries may contribute to or dampen the transmission of crises across countries. To advance in our understanding of their behavior, we model how injections and weights vary over time using some parsimonious models that, nonetheless, capture basic and important properties of the data.

Underlying investors may link their injections into a fund to attributes that vary at the fund level and over time. Therefore, to study the behavior of injections we regress them on variables measuring the occurrence of crises (both at the countries of destiny of a fund and the global level), returns of the fund, and returns of its country of origin. This allows us to test, for example, if investors inject more resources into a fund when it is performing well, as previously shown for U.S. mutual funds by Chevalier and Ellison (1997), among others. It also permits us to estimate how investors react to changes in the conditions experienced by the countries in which funds invest, measured by crisis at the country of destiny. Furthermore, investors are also affected by shocks such as global

crises and changes in the conditions at their country of origin, which can lead to change their investments in the type of international mutual funds we analyze. During good times, investors may feel richer and desire to invest more internationally and diversify risk, and vice versa. But it could also be the case that investors prefer to invest more internationally when conditions in their home countries worsen, since international markets might provide better prospects in relative terms. Ex-ante, these effects are not obvious. Investors may react to different types of shocks pro-cyclically, counter-cyclically, or not react at all.

We sequentially regress the injections to a fund on a weighted country crisis dummy, a dummy variable taking the value one during periods of global turmoil, lagged fund returns, and the returns of the fund's country of origin.[20,21] This is akin to an augmented version of the specification estimated by Sirri and Tufano (1998) for U.S.

[20] In the regressions, we normalize the injections to a fund (given by Equation (2)) by the average assets instead of the initial assets to isolate fluctuations in injections from fluctuations in initial assets. Results using injections normalized by initial assets (available upon request) are qualitatively and quantitatively similar to those reported here, but estimators are less precise because of the additional volatility of the denominator in the expression.

[21] The weighted country crisis dummy is constructed using yearly country crisis data, weighted by the fund's country portfolio weights at the beginning of the year. The crisis variable comes from Broner et al. (2010) and dates a crisis the years when a country suffers at least a banking, debt, or currency crisis, according to indicators widely used in the literature. The periods of global turmoil are: July 1997-December 1997 (the Asian crisis), August 1998-December 1998 (the Russian crisis), March 2001-December 2001 (the dotcom bust, September 11, and the Enron scandal), and September 2008-June 2009 (the global financial crisis). Fund returns are computed from fund-price data. Returns of the fund's country of origin are measured using a broad equity price index from the country where the fund is located. Funds that are domiciled in Luxembourg are matched with country returns from Belgium since there are no available indexes for bonds and equity from Luxembourg.

mutual funds.[22] In addition, the regressions include, alternatively, fixed effects at the fund, time, and country of origin-time levels. Standard errors are clustered at the country of origin-time level to control for correlation in injections to funds located in the same country.[23]

The results reported in Table 4 show that injections to both equity and bond funds fall when the countries of destiny are affected by crises (Column (1)) and in periods of global crises (Column (2)). On the contrary, injections increase in response to the lagged returns of the fund (Column (3)), which are presumably observable by the underlying investors, and in response to increases in the contemporaneous returns in the country of origin of the fund (Column (4)), which capture local conditions. Interestingly, among both equity and bond funds, the coefficient on lagged fund returns is lower than that for country of origin returns. One can interpret this difference as suggesting that wealth effects are stronger than substitution effects (across funds). A decline in local conditions does not itself lead investors to increase their investments in international funds to take advantage of equity return differentials or "carry-trade" effects (in cases when these declines are associated with low interest rates). Nonetheless, controlling for the conditions in the country of origin, more money flows into (or less money gets out of) the better performing funds.

[22] Sirri and Tufano (1998) include a longer set of lags of injections and fund returns in their specification. We also estimated a version including up to three lags of both variables obtaining similar results.

[23] Clustering estimations by time yields very similar results to using clusters by country of origin-time.

The regression in Column (5) includes all the previous variables simultaneously and shows similar coefficients than those obtained in the single-variable regressions, except for the impact of country crisis on equity funds. This indicates that while in some cases the country-crisis variable is capturing the variation coming from periods of global turmoil, the potential correlation between global crises and returns at the fund and country level is not behind the significant results obtained in the previous columns.

Quantitatively, a global crisis reduces injections to equity funds by about 1 percentage point. This is much larger than the average monthly injection of about 0.1 percentage points, and 20% of the interquartile range of variation of injections over average assets (5 percentage points). Similarly, a 10% decline in fund returns also reduces injections by 1 percentage point. Since crises and fund returns are negatively correlated, the joint impact of crises is larger. Finally, a 10% decline in the returns of the country of origin (domicile) of the fund reduces injections by 2 percentage points. The quantitative importance of these variables for bond funds is higher. For instance, a global crisis reduces injections to bond funds by 3 percentage points. Although the average injection over average assets for these funds is also higher (1.3% instead of 0.1% for equity funds) the interquartile range of variation is similar than in equity funds (5%). Thus, because of greater coefficients, injections to bond funds react more strongly to returns and crises in the target countries and the country of origin.

The regressions in Columns (6) and (7) add time and country of origin-time fixed effects to the regression in Column (5), respectively. In both cases, and among equity

and bond funds, the impact of country crisis declines and becomes statistically insignificant (the global crisis variable is dropped from the regression in both cases because it varies only with time). This confirms that the identification of the coefficient in Column (1) comes mainly from a common, time-varying component, and not from the idiosyncratic incidence of crises in individual countries. Lagged fund returns and country returns remain statistically significant, except when including country of origin-time fixed effects for bond funds, where the coefficient for these returns retains the magnitude but becomes marginally significant (with a p-value of 0.11).

The results above show that the underlying investors respond to local and international conditions when deciding whether to inject or withdraw money from mutual funds. Fund managers must then choose how to allocate or liquidate positions in response to these injections/redemptions and the realized returns of their investments. It is this response (or lack thereof) that ultimately determines the net inflows/outflows to the countries where each fund invests.

To empirically study the behavior of fund managers, we start with the following identity that relates the country portfolio weights of a fund in two subsequent periods

$$w_{ijt} = w_{ijt-1}\frac{\left(R_{ijt} + f_{ijt}\right)}{\left(R_{it} + f_{it}\right)}, \tag{3}$$

where w_{ijt} is the portfolio weight of fund i in country j at time t, R_{ijt} and R_{it} are the gross returns of the investments of the fund in country j and across its whole portfolio, respectively. Finally, f_{ijt} is the net flow of money from fund i to country j at time t, expressed as a fraction of the fund's initial assets in the country A_{ijt-1}, and f_{it} is the

injection/redemption of funds into (out of) fund i by its underlying investors, expressed as a fraction of the initial assets of the fund A_{it-1}.[24]

The expression in Equation (3) simply states that the weight of a country in a fund portfolio at the end of time t depends on the country's initial portfolio weight, the return of the fund's investment in the country, the return of the whole fund portfolio, the fund's new net inflows into and out of the country, and the fund's injections/redemptions. Intuitively, in absence of any type of flows (by the fund across countries or to the fund), the portfolio weight of a country would increase (decrease) only if the country assets have a higher (lower) return than those of other countries in the fund portfolio. Henceforth, we will refer to the counterfactual country portfolio weight in absence of any new flows or injections, $w_{ijt}R_{jt}/R_{it}$ as the *buy-and-hold weight*. The presence of injections adds another layer of variation in relative weights because they would require the fund to allocate new money across countries or to liquidate positions that may result in changes in portfolio weights. Furthermore, the flows to different countries do not need to be linked to injections; even in the absence of the latter, managers might decide to change country weights by reallocating positions across countries. While Equation (3) is an identity, it does not imply any specific behavior for country portfolio weights at time t because funds have the liberty, in principle, to relocate funds across countries as they see fit (through variations in f_{ijt}) to achieve a given portfolio composition.

[24] As explained in Section 2, for data availability reasons we assume that the returns of all funds i investing in country j are identical; namely, $R_{ijt} = R_{jt}$ across funds.

The discussion above shows that Equation (3) is a useful starting point to analyze the behavior of portfolio weights. Log-linearizing that equation around a state with gross returns equal to one and zero injections, one obtains the following expression

$$\omega_{ijt} = \omega_{ijt-1} + (r_{jt} - r_{it}) + (f_{ijt} - f_{it}) + \theta_{it} + \epsilon_{ijt}, \tag{4}$$

where ω_{ijt} is the log of w_{ijt}, lowercase r represents the corresponding net returns associated with the gross returns described above, and θ_{it} and ϵ_{ijt} are the main components of a second order approximation error.[25] This expression clearly shows that in the absence of relative flows $(f_{ijt} - f_{it})$ there is complete pass-through from relative returns $(r_{jt} - r_{it})$ into weights (to a first order log approximation).

We allow the relative flows (which are at the complete discretion of fund managers) to depend on lagged weights, relative returns, and the incidence of crises as follows,

$$(f_{ijt} - f_{it}) = \delta\omega_{ijt-1} + \eta(r_{jt} - r_{it}) + \gamma C_{\mathrm{jt}} + \varphi_{ij} + \nu_{ijt}. \tag{5}$$

C_{jt} is a dummy variable that takes the value one if country j experiences a crisis at time t, φ_{ij} is a country of destiny-fund fixed effect, and ν_{ijt} is an error term. δ, η, and γ are parameters that capture the sensitivity of relative flows to lagged weights, relative returns, and crises, and the rest of the notation is the same as above. The inclusion of relative returns as determinants of relative flows is standard in the literature (e.g. Hau and Rey, 2008). We augment this dependence of flows on country performance by

[25] We separate the two components because the θ_{it} term that contains expressions on r_{it}^2 and f_{it}^2 may become especially important when these variables significantly deviate from the approximation point. It may be, therefore, useful to control for them in a non-parametric manner.

including the crisis indicator. Finally, the presence of lagged weights captures the possibility that flows respond to deviations of those weights from some desired target level.

Replacing Equation (5) back in Equation (4), we obtain the following empirical specification for the evolution of fund portfolio weights,

$$\omega_{ijt} = \alpha\omega_{ijt-1} + \beta\left(r_{jt} - r_{it}\right) + \gamma C_{jt} + \varphi_{ij} + \theta_{it} + u_{ijt}, \tag{6}$$

where $\alpha = 1 + \delta$, $\beta = 1 + \eta$, and the rest of the notation is the same as above. This is an estimable equation that allows us to study the determinants of a fund's country portfolio allocations and, replacing the estimated parameters back in Equation (5), the determinants of its relative flows.[26,27]

Table 5 reports estimates of Equation (6) for equity funds (Panel A) and bond funds (Panel B). The regression includes country weights in the target region of a fund (i.e., in countries within the main scope of investment), and excludes cash weights, which are analyzed separately. The first five columns report the main parameters of

[26] Note that the model described by Equation (6) corresponds to a dynamic panel and that omitting the fund-country fixed effect, or cleaning it by taking differences will result in inconsistent parameters, especially for the lagged weights (Arellano and Bond, 1991). Estimating the fixed effects using the least squares dummy variable estimator is still asymptotically biased, but the bias is of the order of 1/T, where T is the time-series length of the typical fund. Since T is relatively large (50 observations for the median fund), this bias is small. Including and estimating the fixed effects is important.

[27] Although it is possible that the process for log weights has a unit root and that standard t-stats cannot be reliably used, standard panel unit root tests (Im-Pesharan) reject the hypothesis of a unit root in log weights. Second, as we report below, we also estimate specifications where the dependent variable is the difference between log current weights and the buy-and-hold benchmark. These differences should be stationary under both the null of a unit root and the alternative. Finally, as we describe next, we estimate the specification at lower frequencies (semi-annual and annual) that make much more likely for weights to differ from past weights.

Equation (6) including different combinations of fixed effects that capture the different sources of variation of the data. The results in Column (1) include no fixed effects, while the results in Column (2) include fund and time fixed effects that decompose θ_{it} on its two dimensions. The results in Column (2) show that the coefficients are very similar to those without fixed effects and that these sources of variation do not have much explanatory power.[28] In the two columns, the coefficient on both lagged weights and relative returns are significantly positive, meaning that weights are serially correlated and positively correlated with relative returns.

The conclusions from the first two columns of Table 5 are not robust to the inclusion of other sets of fixed effects capturing shocks of higher dimensions. Columns (3), (4), and (5) include, alternatively and jointly, fund-time fixed effects and country of destiny-fund fixed effects. The results in Column (3), which include fund-time fixed effects, exhibit a significant increase in the coefficient for relative returns. They indicate that the low coefficient on relative returns documented in the initial columns is largely due to fund-level, time-varying shocks, such as those to injections and fund returns that are part of the approximation error in Equation (4).[29] When including the country of

[28] Results controlling for shocks to the fund at the country of origin level (unreported) are also similar to those obtained without fixed effects and to those obtained with fund and time fixed effects, indicating that shocks at the level of country of origin do not play an important role in the dispersion of portfolio allocations.

[29] For instance, in the nonlinear version of the identity (Equation (3)) the impact of fund returns on weights depends, among other things, on its injections. If these injections are large, weights would be mainly driven by these injections and respond relatively less to returns. Furthermore, from an econometric standpoint, these fixed effects also control for time variation in the within-fund (across-

destiny-fund fixed effects (Column (4)), the coefficient on lagged weight declines significantly relative to the other columns. This is consistent with the existence of some stable "target" component of weights per country for each fund.

Including only the two sets of fixed effects that have some impact on the coefficients (country of destiny-fund and fund-time fixed effects), the regressions in Column (5) show that at the monthly level there is an important, albeit incomplete, degree of pass-through of relative returns to weights. Managers do not undo to an important extent the short-term impact of relative returns on their positions, and let them erode as a result of low returns. Using Equation (5) to uncover the behavior of relative flows, we find that they are weakly negatively related to relative returns at a monthly frequency.[30]

The regression in Column (6) further investigates the pro-cyclicality of fund allocations by including a country-crisis dummy, as in Equation (6), to test if funds react especially to crises periods. The results show that funds decrease their exposure to countries that experience crises. A crisis results in a 2% decline in the weights assigned to the affected country, on top of the decline implied by the relative returns. The strong negative relation between portfolio weights and country crises implies that fund flows also respond negatively to them. Thus, while relative flows are neutral or mildly

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countries) dispersion of weights (captured in the average log weight), and identifies the importance of relative returns using only within-fund, across-countries variation in returns and allocations.

[30] For the readers interested directly in the parameters of the flow Equation (5), Appendix Table 8 reports the same regressions shown in Table 5 but using relative flows (the difference between log weights, log lagged weights, and net relative returns) as dependent variable. The conclusions from this exercise remain the same.

contrarian during normal times, as shown in Column (6), they are strongly pro-cyclical during crises.

It is important, however, to be cautious about interpreting the contrarian behavior of relative flows during normal times as implying that funds *wish* to increase their exposure to underperforming countries. To reach that conclusion, one requires a model of the relation between relative flows and desired weights. Appendix 3 presents a simple but very flexible partial adjustment model of this relation, and shows that under reasonable assumptions, the results reported above are consistent with desired weights that are *positively* related to relative returns. The intuition for this apparent contradiction is that in the model relative flows depend on the difference between the fund's desired and initial (buy-and-hold) weights. If desired weights are higher (lower) than buy-and-hold weights, money flows into (out of) a country. Since a decline in relative returns has a direct one-to-one pass-through impact on the buy-and-hold portfolio weights, if desired weights decline less than one-to-one with relative returns, relative flows would tend to move in a contrarian manner (even when desired weights decline with a fall in returns).

The last two columns of Table 5 repeat the specification in Column (6) using data aggregated at different frequencies. The results show that the importance of pass-through declines at lower frequencies, as funds have more time to adjust their positions after changes in relative prices. The same is valid for the response of flows which are more negatively related to relative returns as the frequency of data is reduced.

Nonetheless, the negative relation between weights, flows, and crises is present at all frequencies.

The results for bond funds (Table 5, Panel B) are broadly similar to those for equity funds, but while the coefficients move in the same manner when various fixed effects are added, the pass-through of returns on weights is much smaller than among equity funds, implying that the underlying relative flows respond to returns in a contrarian fashion.[31] Quantitatively, a decline of 10 percentage points in a country's relative returns reduces its weight on about 6%. The response of weights and flows to crises is negative but statistically insignificant. Bond funds seem to behave in a more contrarian way than equity funds. This behavior may result from a lack of ability to quickly liquidate bonds of countries suffering strong reversals, because of the lower liquidity of some bond markets. Thus, in the short run bond funds may be forced to liquidate positions in countries that do relatively better in order to meet redemptions, but as they can slowly accommodate their positions they react pro-cyclically to return differentials. Another possible explanation is that the unobserved benchmarks followed by bond funds do not react as fast as those of equity funds to relative country returns. Finally, as we show below, these findings may also be explained by higher precautionary holdings of cash by bond funds than by equity funds.

We conducted a series of robustness checks on the results of the basic specifications reported in Table 5 without finding significant changes in our results.

[31] Note that this does not necessarily imply a contrarian response of total country flows because relative flows are measured relative to the injections to the fund, which we know react negatively to bad news.

Among these checks we estimated the model using only funds with at least three years of data, we added more lags of log weights and relative returns (up to three), we considered countries both inside and outside the relevant region, and we estimated the model separately for global equity funds and regional equity funds. In all cases, the qualitative and quantitative results (available upon request) are similar to those reported in Table 5.

The log transformation used above and the regressions reported in Table 5 discard the information contained in the zero weight countries. It is not obvious if these zeroes should be included or not because some cases may correspond to countries that are out of the scope of investment of a fund for reasons we do not observe (prospectus or underlying unobserved benchmark). To check the concern that the zeroes may contain useful information while minimizing the probability of zeroes that are related to the scope of the fund, we re-estimate the regressions in levels including only the zeroes corresponding to countries that are in the region or market segment declared as part of the scope of the fund. To maintain consistency with the equation in logs, we include as explanatory variables the level of the buy-and-hold weight and the country's relative returns expressed as the ratio of the gross returns of the country and the portfolio. The results, shown in Table 6, are qualitatively consistent with those obtained with the specification in levels, despite significantly increasing the number of observations (from 460,000 to 740,000): weights decline when relative returns fall and when a crisis hits a country. Quantitatively, the implied results are larger than in the log specifications. In

equity funds, a 10% decline in relative returns would reduce weights by 1 percentage point, in addition to the pure pass-through effect. This is about 20% of the average weight (5%). The impact of a crisis is also larger: it results in a 10 percentage point decline in weights.

Both equity and bond funds maintain a fraction of their assets in cash. This cash may be used as a buffer to park money before and after buying and selling assets, meet redemptions, and strategically take advantage of sudden investment opportunities. The regressions in Table 7 characterize the behavior of the cash weights in logs. In unreported results, we also ran the same regression for cash in levels, obtaining similar results. The specifications are analogous to those reported above, with gross cash returns assumed to equal one so that relative returns correspond to minus fund net returns. Since cash weights vary only in the fund-time dimension, we limit the set of fixed effects included.

The results in Table 7 show that a decline in equity fund returns results in an increase in cash. In other words, equity funds accumulate extra cash in bad times and reduce these positions in good times. Quantitatively, a 10% decline in the return of the fund results in a 7% increase in cash. The results also show a significantly lower pass-through on cash weights, with coefficients on log lagged cash weights much smaller than one. The results in Column (3), which include time fixed effects, show that most of the positive relation between cash weights and cash relative returns results from variations in global conditions. After controlling for those fixed effects, the coefficient on relative

returns, while still positive, becomes smaller than that of lagged weights and not significant. The regression in Column (4), without time fixed effects, shows that the variables capturing the prevalence of country and global crises are associated with both an increase in cash and a decline in the coefficients for relative returns, confirming that, to an important extent, the relevance of relative returns comes from global conditions. A fund experiencing a crisis in one of its target countries increases cash by 10% of the share of that country in its portfolio, and a fund experiencing a global crisis increases cash by 16%. Columns (5) and (6), focusing on the results at different frequencies, show again a smaller and vanishing degree of pass-through, indicating that at lower frequencies cash weights tend to converge to a target level that is not driven by price fluctuations. However, even at this level of aggregation country and global crises can explain some of the variation in cash weights.

Interestingly, the response of cash weights to returns is much different in bond funds. Among these funds, cash moves in opposite direction to returns, even though pass-through would suggest a positive response. Bond funds seem to accumulate cash when fund returns are high (low relative returns). Why is this effect dominant only for bond funds? This result may be due to the stronger response of injections to returns among bond funds (Table 4): a high return results in injections that are temporarily parked in cash. Similarly, a bad fund return may require a decline in cash while the fund meets redemptions. Another explanation is that, since bond funds hold more cash on average, they are better able to respond to injections/redemptions through variations

in cash without having to liquidate assets or relocate money across countries. This is only a proximate explanation because, of course, the level of cash held by bond funds is an endogenous choice. Nonetheless, one can rationalize both the level and cyclical fluctuations in cash if the bond markets where international funds invest are less liquid than the corresponding equity markets, so that funds cannot quickly adjust positions to meet redemptions without taking large losses through fire-sale prices, which may lead them to hoard more cash. These results can also explain the weaker response of country weights to relative returns among bond funds in the short run: a decline in country returns prompts bond funds to liquidate cash to meet redemptions, dampening the impact of this decline on the country weights. Results in levels including the zero cash weights are qualitatively similar to those in logs (unreported).

5. Gross and Net Country Flows: The Role of Investors and Managers

We next quantify the relative importance of the underlying investors and managers in explaining the gross and net capital flows by mutual funds to different countries. "Gross flows" are the growth rate of total assets invested by mutual funds in a country (including returns of past investments). "Net flows" are inflows/outflows of money (gross flows minus the return in each country).[32]

[32] Note that this is a specific definition of gross and net flows that fits well with the discussion on this paper, but the literature has employed the terms with many other ways. For our computations, we use the growth rates of assets between two consecutive periods in a country using only the funds that have investments in that country in both periods. That is, we do not include entry-exit in the calculations. The

The assets held by mutual funds in country j trivially correspond to the sum of the assets held in that country by each one i of the funds that invest in it, $A_{jt} = \sum_i A_{ijt}$. Taking log differences we obtain the following decomposition for the growth rate of total assets in a country (gross flows)

$$\hat{A}_{jt} = \sum_i s_{ijt-1}\widehat{w}_{ijt} + \sum_i s_{ijt-1}\hat{A}_{it}, \tag{7}$$

where $\hat{A}_{jt}$ denotes the growth rate of total mutual fund assets in country j at time t, $s_{ijt} = A_{ijt}/A_{jt}$ is the share of total country j assets represented by fund i, $\widehat{w}_{ijt}$ is the growth of the weight of country j in the portfolio of fund i between t and $t-1$ and, and $\hat{A}_{it}$ is the growth in total assets of fund i within the same interval.

Equation (7) states that gross flows of money from mutual funds to a country may increase because funds increase the weight of that country in their portfolios, or because the total assets of the funds investing in the country are increasing. The economic interpretation of these two components as capturing the contribution of fund managers versus that of the underlying investors require to take a stance on the scope of activities within the realm of decision of each of these two sets of market participants. Assuming that changes in weights are the managers' choice and the growth rate of fund assets is exogenously determined, one may interpret the first component as corresponding to the managers' decision and the second component to that of the underlying investors. This is one of the decompositions we estimate below.

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reason is that we do not know whether entry-exit in our sample corresponds to real entry-exit or variations in data coverage.

The other main decomposition we use works with net flows to a country (growth in total assets net of returns, f_{jt}) by isolating the contribution of the growth in weights net of returns (relative flows) and injections to net flows, in the following manner,

$$f_{jt} = \sum_i s_{ijt-1}\left(\widehat{w}_{ijt} - \left(r_{jt} - r_{it}\right)\right) + \sum_i s_{ijt-1} f_{it}$$
$$f_{jt} = \sum_i s_{ijt-1}\left(f_{ijt} - f_{it}\right) + \sum_i s_{ijt-1} f_{it}. \tag{8}$$

A nice feature of the decomposition in Equation (8) is that both terms have a very clear economic interpretation. The first term is the change in weights net of relative returns, which corresponds to relative flows of managers to a country, and the second corresponds to injections/redemptions into the fund. The flows of fund money to country j increase either because the fund manager is investing relatively more money into the country or because the fund has injections by the underlying investors that are proportionally allocated to all countries. For additional information including two other decompositions see Appendix 4.

The results of the decompositions in Equations (7) and (8) are reported in two separate panels of Table 8 and offer a good picture of the role of managers and investors in explaining gross and net flows of capital to countries. Each panel reports two sets of results: the average contribution of each of the two components to the level and variance of each type of flow.

To illustrate what Table 8 reports, take the example of gross flows in Panel A. The calculation for the left side of the panel (the "shares") is as follows: for each country and time we compute the share of each component (growth in weights and

growth in fund assets) in the growth in the country's gross assets. We then compute for each country the average over time of each of these components, and finally take their average across all countries in each of the groupings in the rows.[33] The right side of each panel ("variance decomposition") reports a standard variance decomposition exercise, where we assess the share of the total variance of gross flows that can be attributed to each component. Again, we first conduct the variance decomposition at the country level and then average across countries to reach the reported estimates. Since the two terms are not orthogonal, we follow Klenow and Rodriguez-Claire (2005) and impute the covariance term equally to each component (see Section 3).

Table 8, Panel A shows that both components of Equation (7) have roughly a similar impact on the level and fluctuations in gross assets (around a 40%-60% split depending on the decomposition). That is, the growth of weights and the growth of fund assets are not very different in explaining the gross flows into countries, although the contribution of the former is largely due to fluctuations in relative returns that are correlated with the movement in gross flows. After controlling for this effect, managers explain 30% of the variation (Appendix 4). In sum, Panel A shows that variations in fund assets, resulting at least partly from the behavior of the underlying investors, explain an important share of the level and variability of gross flows. If one considers changes in weights due to variations in returns part of manager's choices, managers

[33] We use both a geographical grouping (Asia, Eastern Europe, and Latin America) and another one (developed, emerging, and non-emerging developing countries) taken from MSCI. Non-emerging developing countries are the ones considered frontier markets by MSCI.

explain about 60% of the variance of gross flows. If not, they still explain a nontrivial, but smaller share.

Table 8, Panel B shows the decomposition of net flows corresponding to Equation (8). The results are clearly different from those for gross flows. In this case, the first component, associated with manager's behavior, explains a larger share of the level and variance of these flows. Net flows are more closely linked to managerial discretion than gross flows since they abstract from the effect of returns on the growth of asset holdings. For all countries, the growth rate of adjusted weights explains 88% of the level of net flows and 85% of their variance. Namely, the term associated with total injections explains 12% and 15% of the level and variance of net flows, respectively. The pattern is very similar across groups of countries.

In summary, Table 8 shows that both managers and the underlying investors play a significant role in explaining the level and fluctuations of international gross and net flows but the relative importance of each of them varies with the type of flow. For gross flows, managers explain a share of the level and variance of flows of around 50%, when not adjusting for returns and depending on the specific decomposition and region. For net flows, however, the bulk of the level and variance of flows (between 77% and 88%) can be explained by manager's behavior. Managerial discretion, measured as deviations of country allocations from buy-and-hold allocations, is very important in explaining the flows of new money to countries.

Table 9 shows the same decompositions as in Table 8 for all countries but for different groups of funds. In each case, the gross and net flows to a country correspond only to the flows coming from that subset of funds. The table also shows decompositions at different frequencies: semi-annual and annual instead of monthly. Not surprisingly, the growth of total weights, capturing manager's behavior, explains always a much larger fraction of the level and volatility of gross flows for active funds than for passive funds. For instance, Table 9, Panel A shows that the growth of weights accounts for 49% and 58% of the level and variance of gross flows for active funds, versus 22% and 32% for passive funds, respectively. Panel B shows that the difference between active and passive funds in the contribution of manager's behavior to net flows is even larger: 87% of the level and variance for active funds, and 15% of the level and 31% of the variance for passive funds, respectively. Namely, the gross and net flows of capital from passive funds to countries respond mainly to the behavior of the underlying investors. Regarding the difference between bond and equity funds, manager's behavior seems to play a slightly larger role among bond funds, for both gross and net flows. Regarding the differences between monthly, semi-annual, and annual frequencies, Table 9 shows a clear pattern. For both levels and variances of gross and net flows, the role of manager's behavior declines with the increase in the length of the period of analysis. Although as seen in Section 4, the ability of managers to change country weights with respect to a buy-and-hold benchmark increases with time, it is also the case that the underlying

investors can react further to fund performance, country conditions, or other shocks. At lower frequencies, the investor side seems to become relatively more important.

In addition to providing a quantitative assessment of the relative importance of manager's and underlying investor's choices for mutual fund capital flows to target countries, the decompositions above, together with our previous estimations, allow us to obtain some back-of-the-envelope calculations of the impact of various shocks on capital flows. Let us start with Equation (7) for gross flows. From Table 4 we know that a 10% decline in (lagged) fund returns reduces injections by about 1 percentage point. Thus, if all funds investing in a country experience such a decline in returns, gross flows will decline in 1 percentage point through its impact on the total assets of these funds (the second term in Equation (7)). This is close to the median gross flows across countries (about 2%) and indicates that there may be important contagion effects through the injections of the underlying investors. Similarly, a 10% decline in the returns of the country where the funds are located will reduce injections to these funds by 2 percentage points. If funds located in the country experiencing the decline are important for a target country, the decline in gross flows will be significant. From Table 6 we also find that a decline in the relative return of a country has almost a one-to-one impact on the growth of weights at a monthly frequency. Keeping fund returns constant, a 10% decline in relative returns results in a 10% decline in the weight of that country in mutual fund portfolios and may induce a similar decline in gross flows. A country crisis

also has an important effect, reducing the growth of weights by almost 2%, with a corresponding decline in gross flows.

A similar set of calculations can be conducted to estimate the impact of various shocks on net (mutual fund) capital flows to a country using Equation (8). Changes in fund injections have the same direct impact on net flows than in gross flows, so a 10% decline in last period returns may reduce net inflows by 1 percentage point, or a 10% decline in the returns in the country of origin of the funds may contract inflows by 2 percentage points. Relative returns also matter. As discussed above, Table 5 shows that a 10% decline in relative returns results in a 0.5 percentage point increase in relative flows, which is considerable relative to the (unweighted) average growth of net flows in the sample (minus 1.5%). However, if this relative return decline is accompanied by a low fund performance or by low returns in the country of origin of funds that induce large redemptions, the consequences for net capital flows may still be severe (3 to 4 percentage point decline).

6. Conclusions

This paper has shown that mutual funds help transmit crises across countries and that their behavior is driven by both the underlying investors and managers. The global crisis was no exception, when there were large reallocations across countries and regions. In particular, the paper has shown that investors react to shocks by pulling out of funds that invest in countries undergoing crises and during global crisis times. In addition,

investors put more capital into funds that have shown to do relatively well and when conditions in their country of origin improve. This pro-cyclical reaction of investors is matched with a similar behavior by fund managers, who face not only shocks from investors injecting and redeeming capital but also from valuation changes in the countries in which they invest. Managers react to these shocks by allowing weights to adjust almost pari passu with returns and partly by moving allocations out of countries experiencing crises. This adjustment of managers takes place over time, with the pass-through from returns to weights diminishing at lower frequencies. During crises, managers of equity funds also tend to accumulate more cash. All these patterns are consistent with how investors and managers behaved during the global crises, when there was retrenchment from emerging economies and Europe and a reallocation towards the U.S.

The findings in this paper have important implications for the theoretical literature and policy discussions. They suggest that, in a world where investors discipline managers through injections and redemptions and there are large shocks, managers of open-ended funds might have difficulties taking advantage of long-term arbitrage opportunities and reacting counter-cyclically, for example by buying assets internationally at fire-sale prices. Therefore, the evidence is not consistent with international deep-pocket investors (mutual funds in this case) playing a stabilizing role. To the contrary, these investors appear fickle.

Regarding the difference between debt and equity, the paper shows that the results are not unique to demandable debt, where the need to get out first is more imperative. The pro-cyclicality occurs even in equity funds, for which prices adjust instantaneously, suggesting that limited information by investors, and/or other factors, need to be playing an important role. While in equity funds cash is used pro-cyclically, being accumulated during crises, in bond funds cash is used more as a buffer, reducing the impact of redemptions on manager reallocations. This could suggest that managers have more difficulty buying and selling assets in markets that might be more illiquid, and thus use more cash to withstand the shocks they face. The results also suggest that, when there is a shock in a country where funds invest, equity funds tend to amplify the shock by acting pro-cyclically, while bond funds might help transmit shocks across countries by acting in relative terms counter-cyclically in that country, generating contagion effects. However, when the shock hits the country of origin where funds are domiciled, both bond and equity funds reduce their investments abroad, implying that wealth effects might be significant. These wealth effects tend to dominate the substitution effects across countries and constitute a mechanism of cross-country crisis transmission.

The evidence also shows that weights are not constant over time. In fact, they fluctuate substantially with shocks. In other words, it is not the case that investors drive all the action and managers act as passive agents, allocating the injections they receive into countries according to some approximate fixed weights. While changes in

weights might partly reflect monthly changes in the benchmark indexes (changing with returns), the findings also suggest that adjustment costs might play a role in manager behavior. Valuation changes pass-through to portfolios weights almost entirely in the short run; only over time they get adjusted and somewhat reverse to pre-shock levels. These adjustment costs could take place because it is difficult for managers to adjust immediately to the shocks they receive and react to them in the short run by buying or selling assets in certain countries (perhaps liquid ones), before adjusting the portfolio elsewhere. These effects are more pronounced during crisis times, since in relative terms during normal times managers reallocate their portfolio towards countries that get negative shocks. For example, equity fund flows are slightly counter-cyclical during normal times and pro-cyclical during crises. These differences are consistent with adjustment costs being larger during crises and shed light on the heterogeneity of behavior of equity funds over time. The evidence could also indicate to some extent that the managers' target or desired weights themselves change over time and fluctuate with returns.

The findings in this paper have important implications for the policy discussion as well. In particular, some of the proposals after the global crisis suggest a shift from banks to a mutual fund model to avoid runs and contagion effects. This paper shows that this shift will not necessarily solve the problem that banks entail and that runs and contagion are possible even in equity funds. The findings also suggest that idiosyncratic risk and market discipline play only a limited role during crises and, thus, regulation

based on those pillars (such as Basel II) would not entirely isolate the financial system from crises. Furthermore, to the extent that open-ended structures constrain long-term arbitrage, there could be socially excessive open-ending and it might be desirable to have more closed-end funds. However, open-ended funds provide more room for investors to monitor managers and avoid moral hazard problems, implying a difficult trade-off between monitoring and long-term investments (Stein, 2005). Another area for possible policy action is the potential for mutual funds to become a source of instability in domestic markets, pushing prices away from fundamental values. Recent work suggests that this might be the case (Jotikasthira et al., 2009). Finally, the findings in this paper imply that shocks to the supply side of funds are hard to dismiss. The actions by different players within institutions interact and get magnified, plus foreign investors (in this case mutual funds) play no stabilizing role by buying at fire-sale prices. This has important policy lessons in terms of liquidity provision and moral hazard. To the extent that shocks come from the supply side of funds, providing liquidity at times of crisis might help stabilize markets and countries. If instead crises were country specific with investors expecting unreasonable rates of returns, providing financing at times of crisis might fuel moral hazard.

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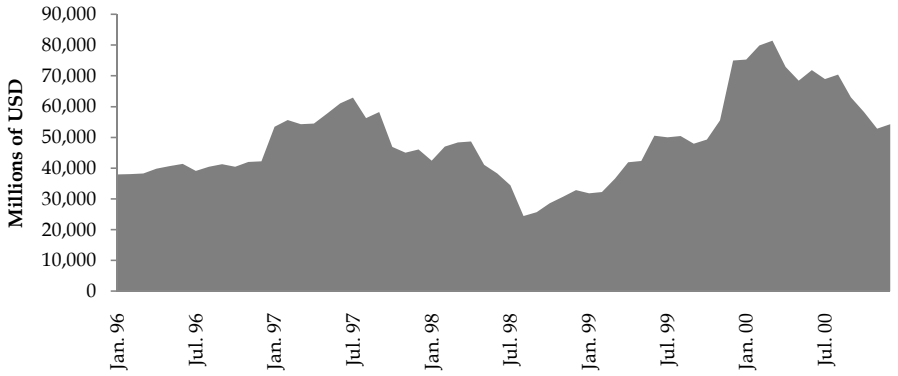
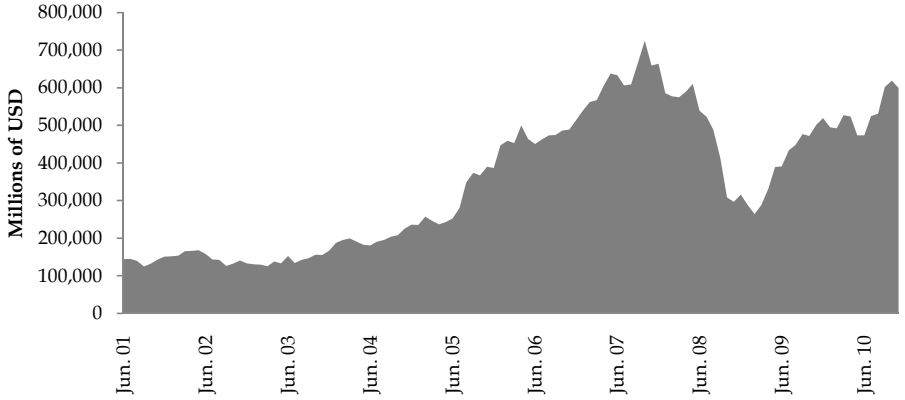
Figure 1
Evolution of Total Assets in Mutual Funds

Panel A presents the total amount of assets in equity funds. The upper figure presents the period January 1996 to December 2000, and the lower figure presents the period June 2001 to November 2010. Panel B presents the total amount of assets in bond funds for the whole period, July 2002 to November 2010.

A. Equity Funds





B. Bond Funds

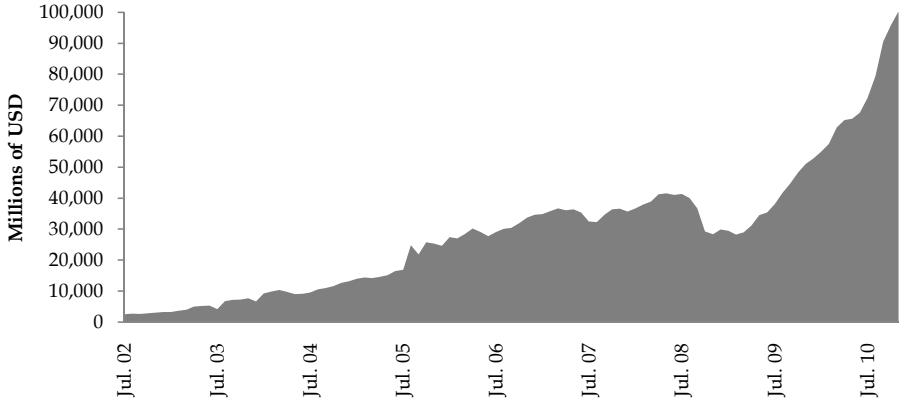


Figure 2
Portfolio Weights during the Global Financial Crisis: Equity Funds

This figure presents the evolution of the average portfolio weights invested in different regions by equity funds during the global financial crisis of 2008-2009. Only countries with stock market price index data are considered to compute the weights. Regions are aggregated according to the EPFR Global classification. Only funds that have complete coverage for the period under study (Jan. 2007 - Dec. 2009) are considered. The grey bars indicate times of stock market turmoil or the fall of financial institutions. In chronological order, they represent: the nationalization of Northern Rock (Sep. 2007), the Bear Stearns collapse (Mar. 2008), the Lehman Brothers collapse (Sep. 2008), and the AIG near-collapse (Mar. 2009).

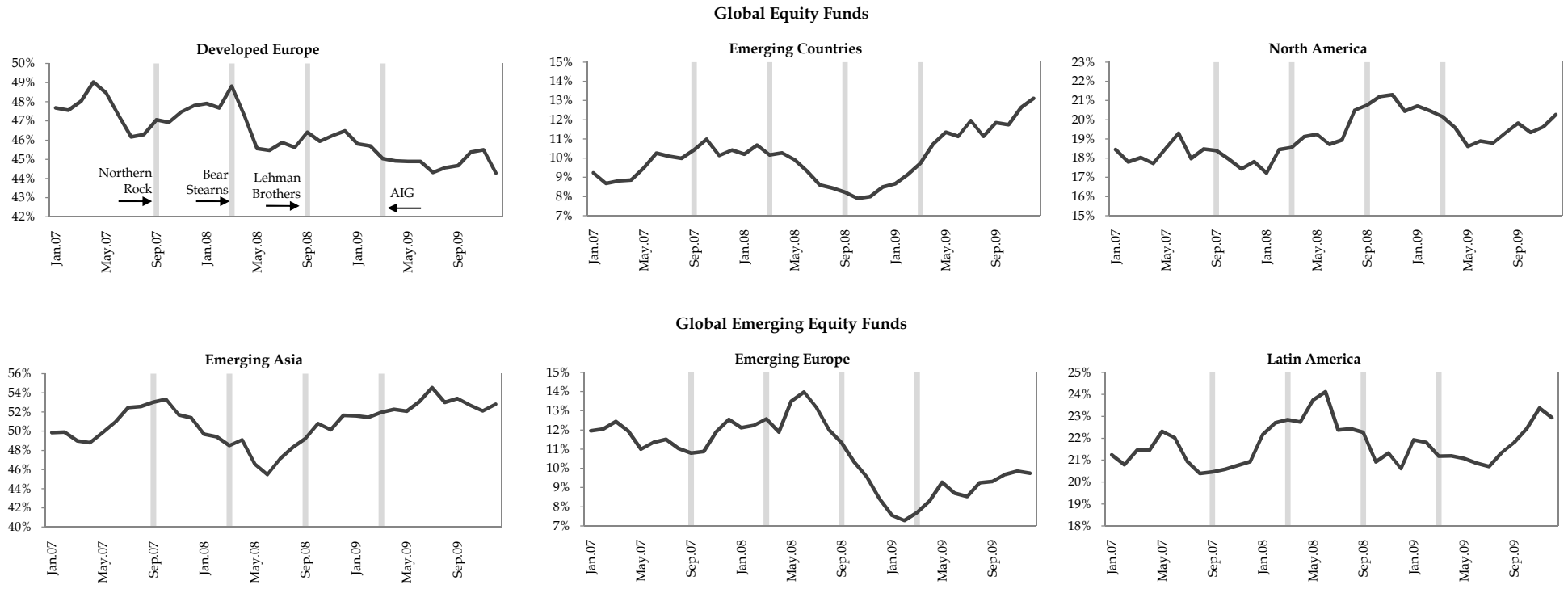


Figure 3
Portfolio Weights during the Global Financial Crisis: Bond Funds

This figure presents the evolution of the average portfolio weights invested in different regions by bond funds during the global financial crisis of 2008-2009. Only countries with bond market price index data are considered to compute the weights. Regions are aggregated according to the EPFR Global classification. Only funds that have complete coverage for the period under study (Jan. 2007 - Dec. 2009) are considered. The grey bars indicate times of stock market turmoil or the fall of financial institutions. In chronological order, they represent: the nationalization of Northern Rock (Sep. 2007), the Bear Stearns collapse (Mar. 2008), the Lehman Brothers collapse (Sep. 2008), and the AIG near-collapse (Mar. 2009).

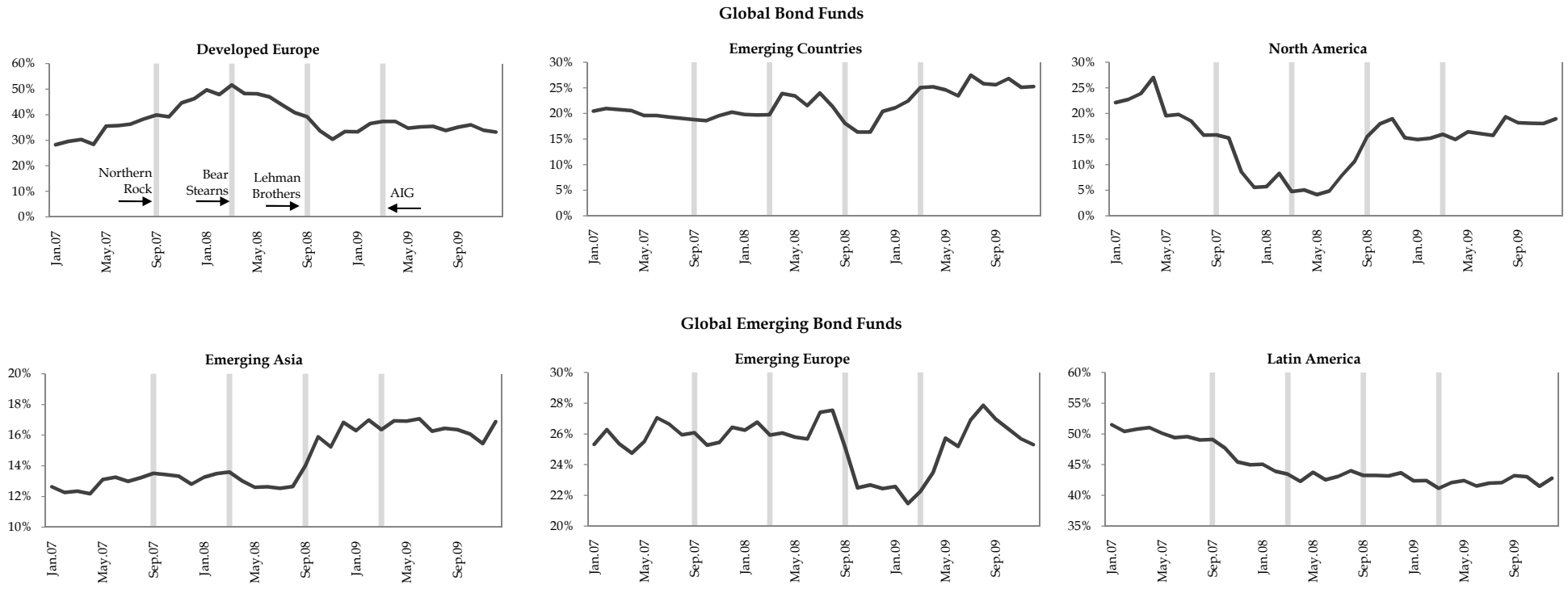


Figure 4
Cash Weights during the Global Financial Crisis

This figure presents the evolution of the average mutual fund portfolio cash weights during the global financial crisis of 2008-2009. Regions are aggregated according to the EPFR Global classification. Only funds that have complete coverage for the period under study (Jan. 2007 - Dec. 2009) are considered. The grey bars indicate times of stock market turmoil or the fall of financial institutions. In chronological order, they represent: the nationalization of Northern Rock (Sep. 2007), the Bear Stearns collapse (Mar. 2008), the Lehman Brothers collapse (Sep. 2008), and the AIG near-collapse (Mar. 2009).

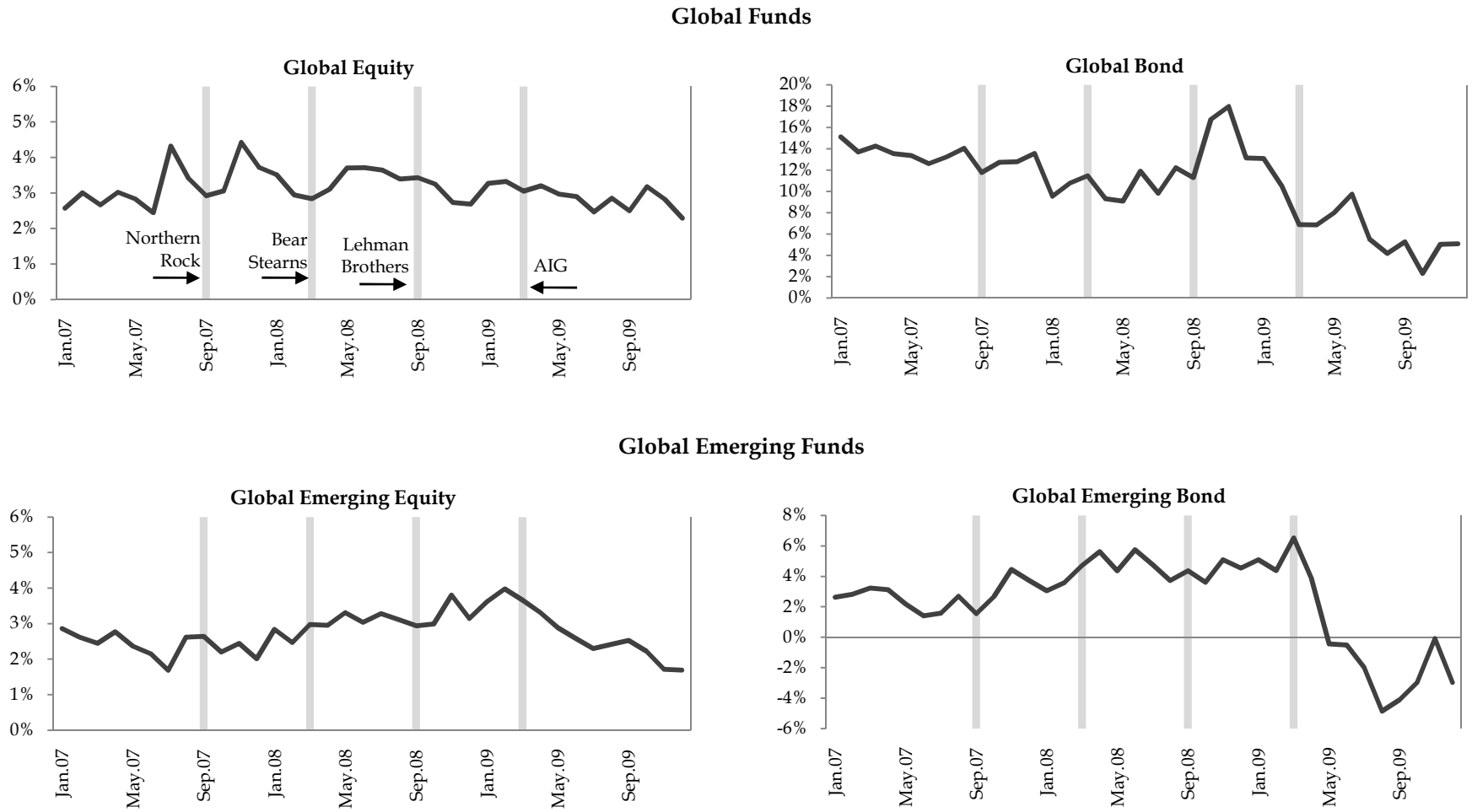


Figure 5
Median Growth Rate of Assets, Returns, and Injections

Panels A, B, and C present, respectively, the median growth rate of total assets, the median fund rate of return, and the median injection over initial assets for equity and bond funds. All variables are first calculated within funds, and then the median is obtained at each point in time considering only continuing funds. Shaded areas indicate times of global turmoil.

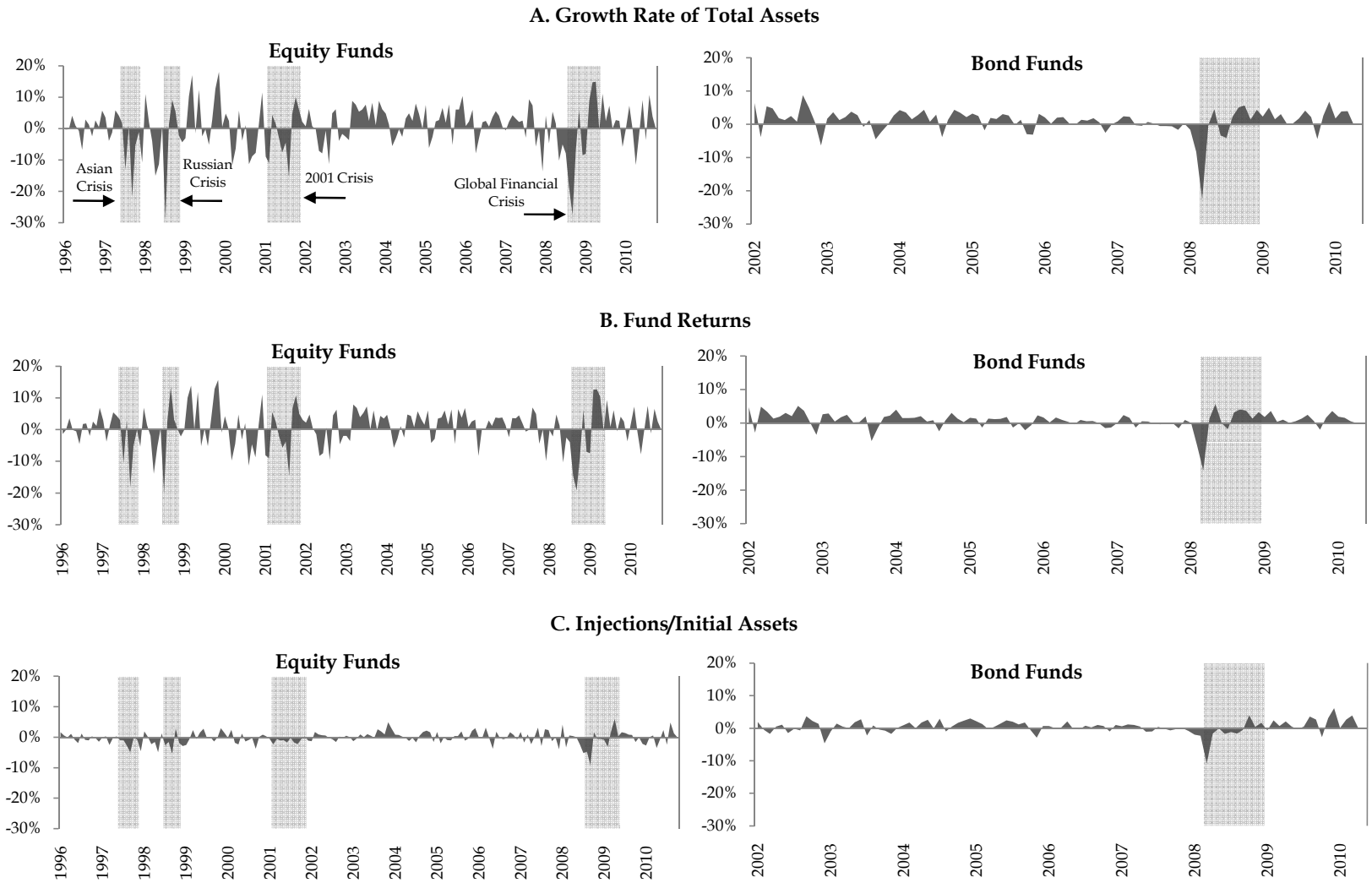


Table 1
Mutual Fund Summary Statistics

This table presents summary statistics on equity and bond mutual funds from the EPFR Global database. Panel A presents statistics across the whole sample. Column (1) presents the number of funds in each category. Column (2) presents the number of monthly observations among all funds within each category. Columns (3) and (4) present the first and last date, respectively, for which there are data available in each category. Column (5) presents the median number of monthly reports within funds. Panel B presents the number of funds and observations by different partitions. Funds are divided by strategy, target region, and according to the country in which the fund is based. The strategy classification between active and passive is based on their stated investment behavior.

A. Whole Sample

	Number of Funds	Number of Observations (Fund-Month)	First Available Date	Last Available Date	Median Number of Observations per Fund (Months)
	(1)	(2)	(3)	(4)	(5)
Equity Funds	965	54,940	Jan. 96	Nov. 10	47
Bond Funds	111	4,492	Jul. 02	Nov. 10	34

B. Number of Funds and Observations by Different Attributes

	Number of Funds	Number of Observations (Fund-Month)		Number of Funds	Number of Observations (Fund-Month)
	(1)	(2)		(1)	(2)
By Strategy					
Active Funds	1,025	58,383	Passive Funds	51	1,049
By Target Region					
Equity Funds			**Equity Funds**		
Asia Ex-Japan	201	13,365	Global Emerging	187	12,972
BRIC	18	610	Latin America	91	6,068
Emerg. Europe, Middle East, and Africa	38	1,253	Pacific	41	2,442
Emerging Europe	91	6,580	**Bond Funds**		
Europe	143	4,824	Global	30	1,096
Global	155	6,826	Global Emerging	81	3,396
By Domicile					
Australia	5	167	Hong Kong	2	38
Austria	5	533	Ireland	104	5,571
Bahamas	3	56	Isle of Man	1	35
Bahrain	4	119	Japan	7	250
Belgium	5	295	Jersey	6	377
Bermuda	2	212	Luxembourg	400	21,528
British Virgin Islands	8	502	Mauritius	1	26
Canada	32	1,897	Netherlands Antilles	2	78
Cayman	15	881	Netherlands	4	239
Denmark	22	1,063	Singapore	3	198
Finland	9	321	Sweden	1	30
France	22	1,328	Switzerland	19	1,298
Germany	22	634	U.K.	137	9,313
Guernsey	15	1,138	U.S.	220	11,305

Table 2
Growth Rate of Assets, Returns, and Injections: Summary Statistics

This table presents descriptive statistics of the growth rate of total assets, rates of return, and injections over initial assets for mutual funds, and the variance decomposition of the growth rate of assets. Panel A presents the mean, standard deviation, and variance decomposition for equity funds, and Panel B for bond funds. Columns (1) - (3) present the mean growth rate of assets, returns, and injections over initial assets. The reported values are obtained by calculating first the mean within funds and then obtaining the mean across funds. Column (4) is obtained by calculating the standard deviation within funds and then the mean across funds for each fund type. Columns (5) and (6) are obtained by calculating the variance within funds for the fund returns and injections over initial assets, and calculating their contribution to the variance of the growth rate of assets. Since the two terms are not orthogonal, the covariance term is imputed equally to each component.

A. Equity Funds

	Mean			Growth Rate of Assets		
					Variance Decomposition	
	Growth Rate of Assets	Returns	Injections/ Initial Assets	Standard Deviation	Returns	Injections/ Initial Assets
Target Region	(1)	(2)	(3)	(4)	(5)	(6)
All Equity Funds	2.20%	1.01%	1.15%	10.34%	47.24%	52.76%
Asia Ex-Japan	2.44%	1.15%	1.24%	10.25%	41.12%	58.88%
BRIC	4.72%	1.33%	3.40%	13.82%	54.82%	45.18%
Emerg. Europe, Middle East, and Africa	1.56%	-0.28%	1.86%	14.57%	33.26%	66.74%
Emerging Europe	2.81%	1.30%	1.35%	12.69%	48.22%	51.78%
Europe	0.65%	0.57%	0.11%	9.61%	38.39%	61.61%
Global	1.59%	0.71%	0.88%	6.96%	54.69%	45.31%
Global Emerging	2.85%	1.32%	1.46%	9.67%	49.57%	50.43%
Latin America	4.05%	1.61%	2.32%	13.11%	48.34%	51.66%
Pacific	1.05%	1.08%	-0.09%	7.98%	45.56%	54.44%

B. Bond Funds

	Mean			Growth Rate of Assets		
					Variance Decomposition	
	Growth Rate of Assets	Returns	Injections/ Initial Assets	Standard Deviation	Returns	Injections/ Initial Assets
Target Region	(1)	(2)	(3)	(4)	(5)	(6)
All Bond Funds	3.94%	0.69%	3.19%	8.66%	11.37%	88.63%
Global	0.61%	0.31%	0.60%	7.39%	9.31%	90.69%
Global Emerging	1.31%	0.43%	0.92%	10.54%	9.74%	90.26%

Table 3
Variance Decomposition of the Growth Rate of Assets around the Global Financial Crisis

This figure reports the variance decomposition of the growth rate of assets around the global financial crisis of 2008-2009. Panel A and B report this decomposition for equity funds and bond funds, respectively. Injections are obtained at the fund level as the difference between the total net assets (TNAs) and lagged TNAs multiplied by returns. Columns (1)-(6) are obtained by computing the variance within funds and then across funds for the respective target region. Since the two terms are not orthogonal, the covariance term is imputed equally to each component.

A. Variance Decomposition of the Growth Rate of Assets for Equity Funds

Period	Before the Global Crisis (Jan. 2003-Feb. 2007)		During the Global Crisis Narrow Window (Mar. 2008-Dec. 2009)		During the Global Crisis Wide Window (Mar. 2007-Oct. 2010)	
	Returns	Injections/ Initial Assets	Returns	Injections/ Initial Assets	Returns	Injections/ Initial Assets
Target Region	(1)	(2)	(3)	(4)	(5)	(6)
All Equity Funds	36.74%	63.26%	67.01%	32.99%	57.65%	42.35%
Asia Ex-Japan	35.97%	64.03%	71.11%	28.89%	57.41%	42.59%
BRIC	41.53%	58.47%	72.15%	27.85%	61.45%	38.55%
Emerg. Europe, Middle East, and Africa	17.47%	82.53%	60.51%	39.49%	52.81%	47.19%
Emerging Europe	40.07%	59.93%	69.37%	30.63%	63.54%	36.46%
Europe	19.98%	80.02%	51.33%	48.67%	44.36%	55.64%
Global	37.06%	62.94%	65.40%	34.60%	60.44%	39.56%
Global Emerging	33.54%	66.46%	70.15%	29.85%	64.71%	35.29%
Latin America	32.60%	67.40%	71.20%	28.80%	58.96%	41.04%
Pacific	37.38%	62.62%	65.15%	34.85%	58.90%	41.10%

B. Variance Decomposition of the Growth Rate of Assets for Bond Funds

Period	Before the Global Crisis (Jan. 2003-Feb. 2007)		During the Global Crisis Narrow Window (Mar. 2008-Dec. 2009)		During the Global Crisis Wide Window (Mar. 2007-Oct. 2010)	
	Returns	Injections/ Initial Assets	Returns	Injections/ Initial Assets	Returns	Injections/ Initial Assets
Target Region	(1)	(2)	(3)	(4)	(5)	(6)
All Bond Funds	12.36%	87.64%	18.78%	81.22%	11.82%	88.18%
Global	5.18%	94.82%	2.66%	97.34%	4.45%	95.55%
Global Emerging	12.90%	87.10%	26.23%	73.77%	20.59%	79.41%

Table 4
Behavior of Injections

This table presents the results of ordinary least squares regressions at a monthly frequency of mutual fund injections over average assets on different variables. Panel A presents the results for equity funds and Panel B for bond funds. The "country crisis" variable is a dummy that indicates if a country has a banking, debt, or currency crisis during a given year. The dummy is weighted by the relative contribution of the country in the portfolio of a fund. The "global crisis" variable is a dummy variable that indicates periods of worldwide crisis (Jul. 1997-Dec. 1997, Aug. 1998-Dec. 1998, Mar. 2001-Dec. 2001, and Sept. 2008-Jun. 2009). "Country of origin returns" are the returns from indexes in the country where the fund is based. Injections/average assets, "lagged fund returns," and "country of origin returns" are all expressed as decimals. Fund fixed effects are included in every case and, alternatively, fixed effects at the time and country of origin-time levels are included. Standard errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

A. Equity Funds

	Injections/Average Assets						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country Crisis	-0.048 ***				-0.003	-0.009	-0.013
	(0.014)				(0.012)	(0.010)	(0.011)
Global Crisis		-0.018 ***			-0.008 **		
		(0.001)			(0.004)		
Lagged Fund Returns			0.161 ***		0.119 ***	0.171 ***	0.178 ***
			(0.024)		(0.023)	(0.033)	(0.039)
Country of Origin Returns				0.261 ***	0.222 ***	0.135 ***	
				(0.024)	(0.023)	(0.028)	
Fund Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	No	No	No	No	No	Yes	No
Country of Origin-Time Fixed Effects	No	No	No	No	No	No	Yes
Number of Observations	41,232	41,232	40,492	39,479	38,764	38,764	40,492
R-squared	0.035	0.036	0.047	0.050	0.065	0.114	0.174

B. Bond Funds

	Injections/Average Assets						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country Crisis	-0.081 ***				-0.070 ***	-0.018	-0.031
	(0.021)				(0.018)	(0.016)	(0.023)
Global Crisis		-0.038 ***			-0.028 ***		
		(0.006)			(0.008)		
Lagged Fund Returns			0.229 **		0.205 **	0.126 *	0.107
			(0.111)		(0.102)	(0.070)	(0.067)
Country of Origin Returns				0.464 ***	0.468 ***	0.337 ***	
				(0.148)	(0.127)	(0.121)	
Fund Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	No	No	No	No	No	Yes	No
Country of Origin-Time Fixed Effects	No	No	No	No	No	No	Yes
Number of Observations	3,520	3,520	3,445	3,261	3,196	3,196	3,445
R-squared	0.061	0.065	0.073	0.068	0.092	0.156	0.266

Table 5
Behavior of Log Country Weights

This table presents the results of ordinary least squares regressions of the log country weights on different variables. Panel A presents the results for equity funds and Panel B for bond funds. The "country crisis" variable is a dummy that indicates if a country has a banking, debt, or currency crisis during a given year. The "relative returns" variable is the difference between country net returns and fund net returns, expressed as decimals. Estimations are performed at different frequencies and include different combinations of fixed effects. Only countries in the target region are considered for each type of fund. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

A. Equity Funds

	Log Country Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi Annual	Annual
Log Lagged Weights	0.986 ***	0.982 ***	0.983 ***	0.899 ***	0.901 ***	0.901 ***	0.568 ***	0.307 ***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.012)	(0.026)
Relative Returns	0.622 ***	0.647 ***	0.993 ***	0.598 ***	0.959 ***	0.956 ***	0.857 ***	0.567 ***
	(0.051)	(0.057)	(0.013)	(0.049)	(0.013)	(0.013)	(0.032)	(0.035)
Country Crisis						-0.020 ***	-0.069 ***	-0.118 ***
						(0.003)	(0.017)	(0.026)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	458,458	458,458	458,458	458,458	458,458	458,458	62,949	26,018
R-squared	0.965	0.965	0.969	0.967	0.971	0.971	0.908	0.890

B. Bond Funds

	Log Country Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi Annual	Annual
Log Lagged Weights	0.974 ***	0.969 ***	0.970 ***	0.868 ***	0.866 ***	0.866 ***	0.448 ***	0.102 *
	(0.002)	(0.003)	(0.003)	(0.008)	(0.009)	(0.009)	(0.037)	(0.059)
Relative Returns	0.237 ***	0.238 ***	0.638 ***	0.219 ***	0.608 ***	0.611 ***	0.296 ***	0.310 ***
	(0.091)	(0.091)	(0.079)	(0.084)	(0.073)	(0.073)	(0.101)	(0.100)
Country Crisis						-0.016	-0.017	-0.026
						(0.011)	(0.050)	(0.084)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	39,183	39,183	39,183	39,183	39,183	39,183	5,035	1,959
R-squared	0.941	0.941	0.946	0.946	0.951	0.951	0.871	0.880

Table 6
Behavior of Country Weights

This table presents the results of ordinary least squares regressions of the country weights on different variables. Panel A presents the results for equity funds and Panel B for bond funds. The "buy-and-hold weight" variable is the lagged weight multiplied by the ratio of gross country return to gross fund return. The "relative returns" variable is the difference between country net returns and fund net returns, expressed as decimals. Estimations are performed at the different frequencies and include different combinations of fixed effects. Only countries in the target region are considered for each type of fund. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

A. Equity Funds

	Country Weights (in %)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi-Annual	Annual
Buy-and-Hold Weight (in %)	0.987 ***	0.984 ***	0.988 ***	0.893 ***	0.913 ***	0.913 ***	0.648 ***	0.461 ***
	(0.003)	(0.003)	(0.002)	(0.016)	(0.010)	(0.010)	(0.109)	(0.050)
Relative Returns	-1.782 ***	-1.619 ***	0.045	-1.512 ***	0.181 ***	0.173 ***	0.864 ***	1.011 ***
	(0.192)	(0.206)	(0.044)	(0.138)	(0.045)	(0.044)	(0.109)	(0.140)
Country Crisis						-0.093 ***	-0.371 ***	-0.602 ***
						(0.021)	(0.086)	(0.105)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Date Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Date Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	741,776	741,776	741,776	741,776	741,776	741,776	105,222	44,146
R-squared	0.982	0.982	0.985	0.984	0.986	0.986	0.951	0.935

B. Bond Funds

	Country Weights (in %)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi-Annual	Annual
Buy-and-Hold Weight (in %)	0.971 ***	0.970 ***	0.971 ***	0.859 ***	0.861 ***	0.861 ***	0.440 ***	0.035
	(0.004)	(0.004)	(0.004)	(0.012)	(0.013)	(0.013)	(0.070)	(0.146)
Relative Returns	-1.563 ***	-1.540 ***	-1.053 ***	-1.359 ***	-0.917 ***	-0.914 ***	-0.120	0.905 *
	(0.184)	(0.187)	(0.273)	(0.168)	(0.234)	(0.234)	(0.283)	(0.529)
Country Crisis						-0.102 *	-0.340	-0.575
						(0.060)	(0.369)	(0.649)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Date Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Date Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	93,819	93,819	93,819	93,819	93,819	93,819	13,116	5,508
R-squared	0.961	0.961	0.962	0.964	0.965	0.965	0.891	0.871

Table 7
Behavior of Log Cash Weights

This table presents the results of ordinary least squares regressions of the log cash weights on different variables. Panel A presents the results for equity funds and Panel B for bond funds. The "relative returns" variable is the difference between country net returns and fund net returns. The "country crisis" variable is a dummy that indicates if a country has a banking, debt, or currency crisis during a given year. The dummy is weighted by the relative contribution of the country in the portfolio of a fund. The "global crisis" variable is a dummy that indicates periods of worldwide crisis (Jul. 1997-Dec. 1997, Aug. 1998-Dec. 1998, Mar. 2001-Dec. 2001, and Sept. 2008-Jun. 2009). "Country of origin returns" are the returns from the indexes of the country where the fund is based. Both "relative returns" and "country of origin returns" are expressed as decimals. Estimations are performed at different frequencies and include different combinations of fixed effects. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

A. Equity Funds

	Log Cash Weights					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Monthly				Semi-Annual	Annual
Log Lagged Weights	0.587 ***	0.389 ***	0.360 ***	0.377 ***	0.112 ***	-0.083
	(0.006)	(0.008)	(0.008)	(0.009)	(0.024)	(0.050)
Relative Returns	0.729 ***	0.700 ***	0.169 *	0.494 ***	0.188 ***	-0.181
	(0.083)	(0.102)	(0.088)	(0.099)	(0.071)	(0.138)
Country Crisis				0.096 *	0.116	0.498 *
				(0.051)	(0.158)	(0.284)
Global Crisis				0.158 ***	0.116 **	0.111
				(0.018)	(0.049)	(0.101)
Country of Origin Returns				-0.168	-0.437 ***	-0.034
				(0.116)	(0.097)	(0.119)
Fund Fixed Effects	No	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	No	No	Yes	No	No	No
Number of Observations	33,681	33,681	33,681	32,416	4,226	1,515
R-squared	0.347	0.433	0.452	0.434	0.435	0.523

B. Bond Funds

	Log Cash Weights					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Monthly				Semi-Annual	Annual
Log Lagged Weights	0.654 ***	0.449 ***	0.446 ***	0.433 ***	0.119	-0.380 **
	(0.022)	(0.029)	(0.029)	(0.030)	(0.078)	(0.176)
Relative Returns	-0.459 *	-0.422	-0.682	-0.381	0.166	0.510 *
	(0.264)	(0.303)	(0.456)	(0.298)	(0.257)	(0.295)
Country Crisis				-0.537 ***	-1.175 *	-1.923 *
				(0.172)	(0.670)	(1.057)
Global Crisis				-0.028	-0.039	0.371 *
				(0.047)	(0.138)	(0.186)
Country of Origin Returns				0.261	0.991	-0.362
				(0.520)	(0.949)	(0.930)
Fund Fixed Effects	No	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	No	No	Yes	No	No	No
Number of Observations	2,857	2,857	2,857	2,745	333	117
R-squared	0.437	0.510	0.532	0.507	0.528	0.660

Table 8
Decomposition of Gross and Net Flows by Regions

This table presents the decomposition of gross and net flows into the growth rate of country weights and the growth rate of total mutual fund assets or injections for different regions. Panel A presents the decomposition for gross flows without adjusting weights for returns, while Panel B presents the decomposition for net flows adjusting for returns. Shares are calculated as the median share of individual components for each country, averaged across time, and then averaged across all countries in each region. The variance decomposition is obtained by taking the variance of each individual component at the country level, and then averaging it across countries. Both gross and net flows are computed as the sum of the two terms in the decompositions. Since the two terms are not orthogonal, the covariance term is imputed equally to each component. Outliers are filtered by the share of the component associated with weights in each decomposition. Only observations within the 10th and 90th percentile of the share of this component are considered.

A. Gross Flows without Adjusting Weights for Returns

	Shares (% of Gross Flows)		**Variance Decomposition (% of Variance of Gross Flows)**	
Target Region	Growth Rate of Weights	Growth Rate of Fund Assets	Growth Rate of Weights	Growth Rate of Fund Assets
All Countries	46.5%	53.5%	59.0%	41.0%
Asia	40.5%	59.5%	55.9%	44.1%
Developed Countries	37.5%	62.5%	46.8%	53.2%
Non-emerging Developing Countries	64.3%	35.7%	78.8%	21.2%
Eastern Europe	47.7%	52.3%	65.5%	34.5%
Emerging Countries	36.1%	63.9%	49.8%	50.2%
Latin America	44.2%	55.8%	56.3%	43.7%

B. Net Flows Adjusting Weights for Returns

	Shares (% of Net Flows)		**Variance Decomposition (% of Variance of Net Flows)**	
Target Region	Return-Adjusted Growth Rate of Weights	Injections	Return-Adjusted Growth Rate of Weights	Injections
All Countries	88.4%	11.6%	84.8%	15.2%
Asia	91.6%	8.4%	84.6%	15.4%
Developed Countries	93.9%	6.1%	87.2%	12.8%
Non-emerging Developing Countries	89.9%	10.1%	91.3%	8.7%
Eastern Europe	85.0%	15.0%	86.3%	13.7%
Emerging Countries	79.9%	20.1%	74.2%	25.8%
Latin America	74.8%	25.2%	75.3%	24.7%

Table 9
Decomposition of Gross and Net Flows by Type and Frequency

This table presents the decomposition of gross and net flows into the growth rate of country weights and the growth rate of mutual fund assets or injections for different breakdowns. Panel A presents the decomposition for gross flows without adjusting weights for returns, while Panel B presents the decomposition for net flows adjusting for returns. Shares are calculated as the median share of individual components for each country, averaged across time, and then averaged across all countries in each region. The variance decomposition is obtained by taking the variance of each individual component at the country level, and then averaging it across countries. Both gross and net flows are computed as the sum of the two terms in the decompositions. Since the two terms are not orthogonal, the covariance term is imputed equally to each component. Outliers are filtered by the share of the component associated with weights in each decomposition. Only observations within the 10th and 90th percentile of the share of this component are considered.

A. Gross Flows without Adjusting Weights for Returns

	Shares (% of Gross Flows)		**Variance Decomposition (% of Variance of Gross Flows)**	
Type	Growth Rate of Weights	Growth Rate of Fund Assets	Growth Rate of Weights	Growth Rate of Fund Assets
Active	49.3%	50.7%	57.9%	42.1%
Passive	21.7%	78.3%	32.0%	68.0%
Equity	47.5%	52.5%	54.6%	45.4%
Bond	66.6%	33.4%	82.2%	17.8%
Frequency				
Monthly	46.5%	53.5%	59.0%	41.0%
Semi-Annual	33.7%	66.3%	40.7%	59.3%
Annual	26.2%	73.8%	35.2%	64.8%

B. Net Flows Adjusting Weights for Returns

	Shares (% of Net Flows)		**Variance Decomposition (% of Variance of Net Flows)**	
Type	Return-Adjusted Growth Rate of Weights	Injections	Return-Adjusted Growth Rate of Weights	Injections
Active	87.4%	12.6%	86.8%	13.2%
Passive	15.0%	85.0%	30.9%	69.1%
Equity	85.9%	14.1%	85.6%	14.4%
Bond	73.8%	26.2%	89.0%	11.0%
Frequency				
Monthly	88.4%	11.6%	84.8%	15.2%
Semi-Annual	83.3%	16.7%	78.9%	21.1%
Annual	80.6%	19.4%	73.0%	27.0%

Appendix 1: Where Do Mutual Funds Invest?

Mutual funds specialize along several dimensions. The most important are geographical regions, market segments (e.g. emerging and developed), and types of assets (equity and bonds). The specialization of funds largely determines the broad patterns of their asset allocation, as shown in Appendix Table 2. The table displays the mean portfolio weight invested in a geographical/market segment region by different types of equity and bond funds, along the number of funds included in each category. The regional classification corresponds to that used by EPFR Global (Appendix Table 3). The mean portfolio weights reported in the table correspond to the average across funds of the mean regional weight of all funds within a category.

Not surprisingly, funds invest mainly in the region/market segment they target. For instance, "Asia ex-Japan" equity funds invest 96% of their portfolio in developed and emerging Asia. Similarly, Latin America equity funds invest 97% of their portfolio in Latin America. Nonetheless, most fund types invest around 5% of their assets outside their target region/segment and in cash. Cash holdings are a small but non-trivial part of fund portfolios. The holding of liquid assets may be due to the need to meet redemptions or to keep injections until they are properly allocated. Some funds might also hold liquidity to be able to invest quickly if opportunities arise (cash-in-the-market). Perhaps consistently with this latter possibility, active equity and bond funds hold much more cash than their passive counterparts. Active equity (bond) funds hold

3.4% (5.7%) of assets in cash on average, while passive equity (bond) funds hold only 0.5% (2%).

Funds specialized in multi-regional market segments show some interesting patters of asset allocation. For instance, global emerging market funds invest mainly in emerging Asia, followed by Latina America, emerging Europe, and emerging Middle-East and Africa. Global equity funds invest mainly in developed Europe, North America, and developed Asia, but within emerging markets follow a similar relative pattern as global emerging market funds. These rankings suggest that funds invest across regions in a manner that is roughly consistent with each region's market size. These patterns are also observed across the countries included in a region. For instance, Latin America equity funds invest most of their assets in Brazil, emerging Europe funds in Russia, and Asia ex-Japan funds in China and India (Appendix Table 4).

Bond funds and comparable equity funds allocate their portfolios across regions in roughly the same manner. The main difference is that while emerging Asia is the principal investment destiny of emerging equity funds, emerging bond funds invest primarily in Latin America, followed by emerging Europe, and with emerging Asia in a far third place. This probably reflects the relative size and development of Latin American sovereign bond markets relative to Asian bond markets, which are, in relative terms, much more largely concentrated on corporate bonds. Bond funds also hold more cash on average than equity funds (8.55% of the portfolio for global bond funds compared to 2.87% of the portfolio for global equity funds).

Although mutual funds invest in regions, countries, and segments in a manner that is consistent with their specialization, the total net assets (TNAs) they hold in target countries experience important variations that roughly coincide with the cycles of international capital flows. Appendix Figure 1 plots the evolution of the median growth rate of total assets held by equity funds (Panel A) and bond funds (Panel B) in a typical country.[34] It shows periods of expansion that coincide with tranquil times for the global economy, followed by contractions that roughly match periods of global turmoil. For instance, Panel A shows a clear expansion at the beginning of the sample period (1996) until the beginning of the Asian crisis, followed by a short-lived expansion that collapses during the Russian crisis. It similarly shows the expansion following the 2001 crisis that lasts until the beginning of the global financial crisis. The pattern of asset evolution for bond funds, reported for the shorter period for which bond fund data are available, displays an analogous picture. At the regional level, there is more variation in the growth rate of fund assets on the median country (unreported), but the overall pattern of expansions and contractions coinciding with regional crises persists.

Overall, the basic statistics reported in this appendix indicate that the mutual funds in our sample allocate funds across countries and regions in a manner that is consistent with their specialization, and also change their total holdings in different countries in a way that follows periods of global expansions and contractions. These

[34] Growth rates are computed considering only continuing funds (those present both at t and t-1) and as a share of the average assets between in t and t-1. Then, the median country is obtained considering the median of growth rates in different countries at a certain point in time.

findings provide support for the use of EPFR Global funds to understand the behavior of global investors.

Appendix 2: How Much Do Country Weights Vary?

To better understand the variation in country weights in fund portfolios, we compute coefficients of variation (CVs) of different types of funds. These CVs correspond to the standard deviation of country weights across funds and within funds (over time) relative in both cases to the corresponding average weight across funds. We normalize the across-fund and within-fund standard deviations by the same mean value for ease of comparison. Appendix Table 5 shows the CVs for the funds' weights across countries within the target region, in both the target and non-target regions, and in cash. It does so for funds investing in different geographical areas and market segments. The classification of target regions is shown in Appendix Table 6 and is taken from MSCI. We compute the target region as the sum of country weights belonging to the target region for each type of fund. The non-target region is calculated as 100 minus cash and target-region weights. The table also shows the CV within the target region, where the CV is computed first in a country and then aggregated across countries in the target region, with the median CV across funds being reported.

Appendix Table 5 shows the result of this exercise. When one focuses on individual countries within that target region (Column (2)) mutual funds show

substantial variation in their investments, however, there is little variation when the target region is aggregated (Column (3)). When focusing at the country level, the CVs in are in various cases larger than one, which means that, for a given country in the region, the standard deviation of country weights across funds is larger than the corresponding average weight. Within the target region, different funds follow different investment strategies. Not surprisingly, mutual funds have a much more volatile allocation in the non-target region compared to their target countries (Column (4)). Their cash allocation also suffers important variations relative to their average cash weight (Column (5)).

Appendix Table 5 shows, moreover, that the variation within funds is smaller than across funds, suggesting that different strategic allocations are behind differences in weights across funds. However, fund allocations to countries within the relevant regions vary substantially over time (Column (2)). The within-fund CVs are again about half of the across-fund CVs, but of the same order of magnitude than the average weights in each country. This indicates substantial within-fund variation in country allocations. Understandably, the variation in country weights is larger than that of the main target region. Namely, Asia funds switch among countries in Asia more than what they switch in and out of Asia, since they have to be invested in that region.

Appendix Table 7 shows similar estimates of the CVs, but partitioning the sample by active and passive funds and looking at different geographical regions. The table shows that the CVs are larger for active funds than for passive funds when

considering the within-fund variation. That is, managers of active funds seem to be more active than those of passive funds. This pattern does not hold for the CVs across funds, denoting similar differences in strategic allocation across passive and active funds, due for instance to the tracking of different benchmarks. In sum, the CVs show that weights vary as expected but also that there is substantial variation in weights, that is, weights do not remain constant across countries and regions, across and within funds. Of course, these results do not explain what drives the changes in weights; in particular, to what extent this variation is driven by prices. While prices will tend to affect weights, they cannot be the sole source of variation since active funds display larger CVs than passive ones.

Appendix 3: Partial Adjustment Model

The parameter estimates of Equation (5) can be interpreted in light of a basic partial adjustment model. Starting with the identity in Equation (4) and transforming it into an estimable equation requires an expression for the relative flows. Intuitively, relative flows depend on the portfolio weight a fund wants to have in a given country at a point in time and its current portfolio weight on that country. If the former is greater than the latter, the fund will try to move relatively more money into the country and vice versa. This intuition can be captured by a simple partial adjustment model,

$$f_{ijt} - f_{it} = \lambda\left(\omega^*_{ijt} - \widetilde{\omega}_{ijt}\right) + \chi_{ijt} \ , \tag{A1}$$

where ω^*_{ijt} is the log *desired weight* in the country and $\widetilde{\omega}_{ijt} = \omega_{ijt-1} + \left(r_{jt} - r_{\mathrm{it}}\right)$ is the log buy-and-hold weight that fund i faces before any flows or injections are realized. The parameter λ captures the fund's speed of adjustment towards its desired weight. A value of λ equal to one implies that the fund immediately adjusts its weights to its desired level through movements in relative flows, and a value smaller than one means that adjustment costs preclude a fund from immediately reaching its target.

This simple description of flows is completely agnostic about the desired portfolio weight ω^*_{ijt}, which is likely the outcome of a fund's optimal portfolio allocation. However, one can parametrically relate these desired weights to country and fund characteristics. In particular, we consider the following equation for log desired weights

$$\omega^*_{ijt} = \delta_{ij} + \phi\omega_{ijt-1} + \eta\left(r_{jt} - r_{it}\right) + \psi C_{ijt} + \nu_{ijt}. \tag{A2}$$

Although admittedly arbitrary, this specification is also very flexible and embeds several alternative forms for the desired weights. For instance, if ϕ, η, and ψ are all equal to zero, and δ_{it} is different from zero, it implies that a fund's desired country weights are roughly constant. On the other hand, if η is different from zero, it means that the desired weight responds to changes in relative returns. The C_{ijt} variables allow us to test for the impact of crises on desired weights.

Replacing Equation (A2) in Equation (A1) we obtain an expression that is analogous to Equation (5) above. Thus, Equation (5) may be interpreted as a reduced form representation of this partial adjustment model. Analogously, replacing Equations (A1) and (A2) in Equation (4) we obtain the following estimable equation

$$\omega_{ijt} = \big(1 - \lambda(1-\phi)\big)\omega_{ijt-1} + (1 - \lambda(1-\eta))\big(r_{jt} - r_{it}\big) + \lambda\psi X_{ijt} + \lambda\delta_{ij} + \theta_{it} + \lambda\nu_{ijt} + \chi_{ijt} + \epsilon_{ijt}, \tag{A3}$$

After grouping parameters, Equation (A3) is analogous to Equation (6). This representation makes apparent that the coefficients on lagged weights (α) and relative returns (β) embed both the pure buy-and-hold effect (captured by the 1 embedded in the coefficients) and the response of relative flows to these variables due to adjustment costs (the speed of adjustment λ) and the sensitivity of desired weights to lagged weights and relative returns (ϕ and η).

Under some identification assumptions, the simple framework described above allows us to use the parameters estimated from Equation (6) to learn about the determinants of the behavior of portfolio managers. The presence of lagged weights in Equation (A2) captures the persistence of some determinants of desired weights that are

not captured by the rest of the model. Therefore, it is reasonable to assume that $\phi \geq 0$. If one assumes that $\phi = 0$, the coefficient on log lagged weights provides direct information on the speed of adjustment. The smaller the coefficient α, the larger is the implied λ and the smaller the adjustment costs (a lower λ is associated with greater adjustment costs). Similarly, finding a coefficient on relative returns, β, different from one does not provide immediate evidence that portfolio managers adjust their desired weights ω^*_{ijt} in response to returns, because it may just come from the presence of costs of adjusting portfolio weights ($\beta = 1 - \lambda$ when $\eta = 0$).

Under the mild assumption that $\phi \geq 0$, what really provides information about the relation between returns and desired weights is the difference between the coefficients estimated for relative returns and log lagged weights, which corresponds to $\lambda(\eta - \phi)$. In this case, a coefficient on relative returns larger than the coefficient for lagged weights means that η is also positive and that desired weights and, hence, relative flows, increase with relative returns (inducing a momentum component in the behavior of relative flows).

The results described above for the preferred specifications including fund-time and country of destiny-fund fixed effects yield coefficients for relative returns that are larger than those for lagged weights (Table 5, Columns 5 and 6). This suggests that desired portfolio weights are positively correlated with a country's relative return. Namely, funds would like to reduce their portfolio weights in a country with negative relative returns. However, to the extent that the impact of relative returns on desired

weights is less than one-to-one ($\eta \leq 1$ in Equation (A2)), the pass through from relative returns to buy-and-hold weights ($\widetilde{\omega}_{ijt}$) dominates and the fund increases its relative flows to that country. Intuitively, what is going on is that desired weights are declining less than the direct decline resulting from relative returns. This may paradoxically result in relative flows that are negatively associated with relative returns.

Appendix 4: Two Other Decompositions of Gross and Net Flows

To obtain other decompositions of gross and net flows, we start with Equation (7) for gross flows: $\hat{A}_{jt} = \sum_i s_{ijt-1}\widehat{w}_{ijt} + \sum_i s_{ijt-1}\hat{A}_{it}$. Note that the first term may grow because of increases in country returns, since a country weight can also be expressed as $w_{ijt} = w_{ijt-1}\frac{(R_{ijt}+f_{ijt})}{(R_{it}+f_{it})}$. Whether one should attribute that increase to a manager decision is open to debate and depends on what "passive benchmark" one has in mind (the counterfactual weight under a "passive" strategy). Attributing the whole growth in weights to managers is akin to having the past period's weight as the passive benchmark. One way of tackling this issue, which is equivalent to considering a different benchmark, is to re-arrange Equation (7) in a way that removes changes in relative returns from the first term,

$$\hat{A}_{jt} = \sum_i s_{ijt-1}\left(\widehat{w}_{ijt} - \left(r_{jt} - r_{it}\right)\right) + \sum_i s_{ijt-1}\left(\hat{A}_{it} + (r_{jt} - r_{it})\right),$$

$$\hat{A}_{jt} = \sum_i s_{ijt-1}\left(\widehat{w}_{ijt} - \left(r_{jt} - r_{it}\right)\right) + \sum_i s_{ijt-1}(f_{it} + r_{jt}), \tag{A4}$$

where the second step uses the fact that $\hat{A}_{it} = r_{it} + f_{it}$. In this decomposition, the first component corresponds to the growth in weights that is not related to returns and depends only on relative flows from fund i to country j, $f_{ijt} - f_{it}$. This way of measuring the contribution of managers implicitly assumes a buy-and-hold strategy as the passive benchmark and only considers deviations from buy-and-hold weights as the responsibility of the managers. The second component has no clear economic interpretation and embeds the other two forces that drive the growth in total assets: injections and the return of the country.

From Equation (8), net flows to a country (growth in total assets net of returns) can be similarly decomposed as follows to isolate the contribution of total changes in weights:

$$f_{jt} = \sum_i s_{ijt-1}\hat{w}_{ijt} + \sum_i s_{ijt-1}(f_{it} - (r_{jt} - r_{it})). \tag{A5}$$

The first term in Equation (A5) allows us to separate the contribution of the total growth in weights to net flows, but in this case the second term embeds the contribution of injections net of relative returns.

Results using Equation (A4) are displayed in Appendix Table 9, Panel A. The results suggest that the growth rate of weights net of returns explains a smaller share of both the level and variance of the growth rate of assets (22% and 32% respectively) when compared to the growth rate of weights reported in Table 8, Panel A. This pattern suggests that the trend of gross flows is slightly dominated by the growth of fund assets, but that most fluctuations around that trend come from the growth in weights. The only exception is non-emerging developing countries, where the growth in weights also explains a large share of the growth in gross assets. This indicates that these countries have benefited from net reallocation vis-à-vis other regions.

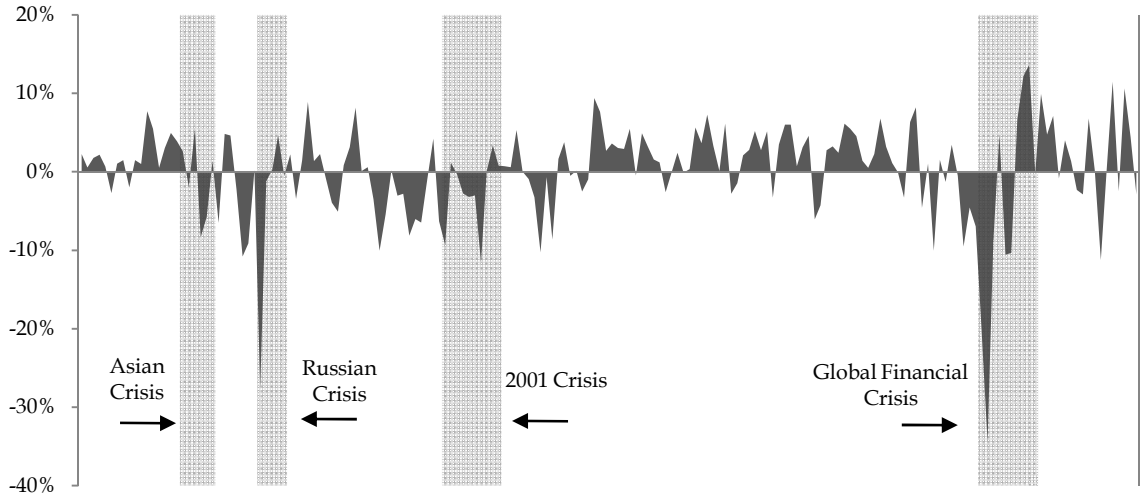
Appendix Table 9, Panel B shows the results for the decomposition of Equation (A5). In this case, the growth of weights explains on average 78% of the level of net flows and 77% of their variance. A comparison with the results in Table 8, Panel B shows that the role of manager behavior is larger when it is associated with changes in weights adjusted by relative returns (equivalent to relative flows) than when considering the total growth of weights. Net flows are more closely associated, at least on a monthly

frequency, with relative flows allocated by managers across countries than with movements in returns.

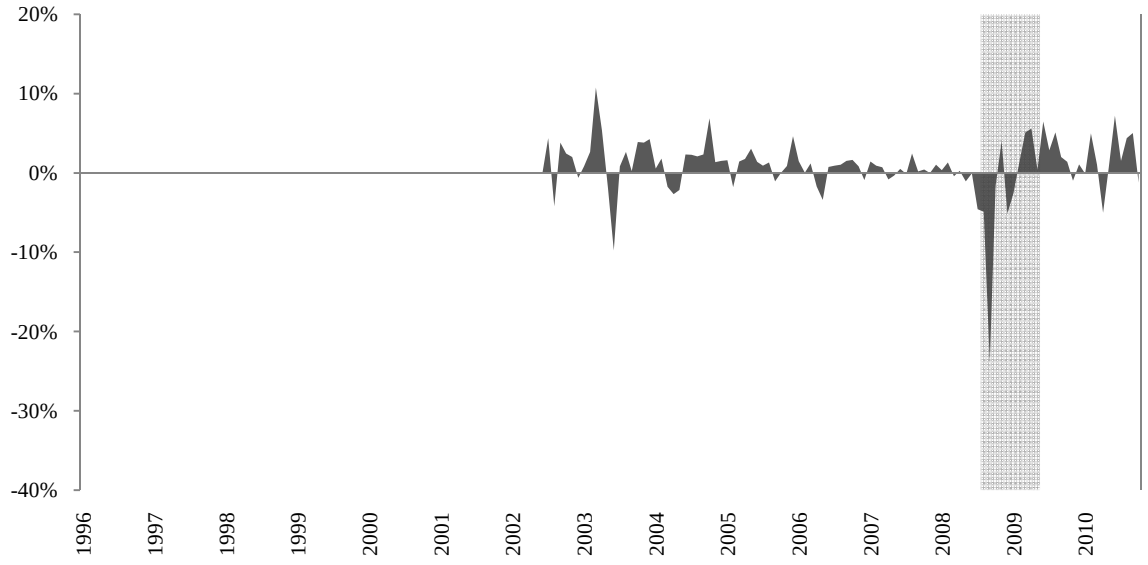
Appendix Figure 1
Growth Rate of Total Assets for the Median Country

This figure presents the growth rate of the total amount of assets for the median country for equity and bond funds in Panels A and B. Growth rates are obtained as a share of the average amount of assets between t and t-1, considering only funds available both at t and t-1. The median country is obtained using the median of the growth rates for different countries in each month. Shaded areas indicate times of global turmoil. Panel C shows summary statistics.

A. Equity Funds



B. Bond Funds



C. Growth Rate of Total Assets for the Median Country

	Mean	Median	Std. Deviation
Equity Funds	0.11%	0.76%	6.15%
Bond Funds	0.82%	1.05%	3.82%

Appendix Table 1
Number of Funds by Asset Management Companies

This table presents the number of funds per family for families with at least two funds. "Other Asset Management Companies" includes all the families with less than two funds.

Management Company	Number of funds	Management Company	Number of funds	Management Company	Number of funds	Management Company	Number of funds
Aberdeen Asset Management	48	Charlemagne Capital Limited	8	ING Investment Management	5	RBC Global Investment Management	3
ABN AMRO Asset Management	8	Clariden Leu	5	Institutional Capital LLC	2	RCM Capital Management	8
Absolute Asia Asset Management	2	Claymore Advisors	2	Invesco Asset Management	46	Rexiter Capital Management	2
Activest	3	Comgest S.A.	16	Investec Asset Management	2	Robeco Asset Management	3
AGF International Advisors	4	Credit Lyonnais International Asset Management	4	ISI - Sydinvest International	6	Schroder Investment Management	40
AIB Govett Asset Management	2	Credit Suisse Asset Management	16	JO Hambro Capital Management	6	Scottish Widows Investment Partnership	3
Algebra Capital	2	Daiwa International Capital Management	2	JPMorgan Asset Management	63	Securities & Inv. Company (SICO)	2
AllianceBernstein Capital Management	3	Deutsche Asset Management	37	Jyske Invest	7	SG Asset Management	2
Allianz Dresdner Asset Management	5	Dexia Asset Management	2	Lazard Asset Management	3	Silk Invest	2
Allianz Global Investors	14	Edinburgh Fund Managers	2	Legg Mason Capital Management	3	Societe Generale Asset Management	8
Amundi Luxembourg SA	5	ERSTE-Sparinvest	2	Lloyd George Management	5	Standard Americas	5
Arisaig Partners	2	Federated Global Investment Management	4	Lombard Odier International Portfolio Advisors	2	State Street Global Advisors	18
Artisan Partners	5	Fidelity Management & Research	9	M&G Investment Management	5	Swisscanto Asset Management	2
Ashmore Inv. Management	13	First State Investments	12	Martin Currie Investment Management	9	T Rowe Price Associates	4
Assenagon Asset Management	3	Foreign & Colonial Emerging Markets	6	Matthews International Capital Management	2	TCW Investment Management	3
Aviva Investors	8	Franklin Templeton Investment Management	35	Mondrian Inv. Partners Limited	2	Thames River Capital	5
AXA Framlington Investment Management	5	Gartmore Investment Limited	29	Morgan Stanley Investment Management	32	Threadneedle Investment Management	15
AXA Inv. Managers	5	Genesis Investment Management	5	Natixis Asset Management	3	Trident Investment Management	2
Baillie Gifford	13	Glitnir Asset Management	5	Nevksy Capital LLP	4	UBS Global Asset Management	16
BankInvest	8	Global Asset Management	7	Nicholas-Applegate Capital Management	2	Union Investment GmbH	6
Baring Asset Management	12	Goldman Sachs Asset Management	4	Nordea Investment Management	2	Van Eck Global Asset Management	4
Batterymarch Financial Management	18	Goodman & Company, Investment Counsel	4	Pictet Asset Management	13	Vanguard Group	2
BCV Asset Management	6	Grantham, Mayo, van Otterloo (GMO)	8	PIMCO	4	Vontobel Asset Management	3
BlackRock Investment Management	55	Griffin Capital Management	2	PineBridge Investments LLC	16	Wells Capital Management	2
BNP Paribas Inv. Partners	27	Halbis Capital Management	11	Pioneer Investment Management	3	WestLB Asset Management	8
Brandywine Asset Management	2	Hansberger Global Investors	3	PowerShares Capital Management	5	William Blair & Co.	7
Capital Invest KAG	2	Henderson Global Investors	11	Putnam Investment Management	10	WisdomTree Asset Mgt./BNY Investment Advisors	2
Capital Research & Management	11	HSBC Asset Management	10	Raiffeisen Capital Management	2	Other Asset Management Companies	83
Total Number of Funds: 1,076							

Appendix Table 2
Weights in Mutual Funds by Geographical Regions

Panel A reports the average weights invested by equity funds in each of the geographical regions reported in the columns and cash. Panel B reports the average weights invested by bond funds. Columns (2)-(10) are obtained by calculating the average weights within funds over time, and then obtaining the mean across funds. Funds are divided according to their target region. The geographical region with the largest average for each type of fund is marked in bold.

A. Equity Funds

		Average Weight (%)								
	Number of Funds	Developed Asia and Pacific	Developed Europe	Emerging Asia	Emerging Europe	Latin America	Middle East and Africa	North America	Other	Cash
Fund Target Region	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Asia Ex-Japan	201	32.83	0.04	**63.20**	0.00	0.00	0.01	0.00	0.02	3.89
BRIC	18	0.97	0.01	**46.46**	16.84	32.58	0.00	0.00	0.91	2.22
Emerg. Europe, Middle East, and Africa	38	0.07	1.10	0.00	14.12	0.00	**77.44**	0.00	0.19	7.09
Emerging Europe	91	0.06	4.08	0.41	**91.17**	0.15	0.43	0.00	0.06	3.62
Europe	143	0.14	**97.16**	0.07	0.34	0.08	0.26	0.05	0.04	1.85
Global	155	16.59	**41.52**	5.03	0.64	2.29	1.28	28.57	1.20	2.87
Global Emerging	187	2.54	1.05	**46.01**	12.03	22.87	10.97	0.01	1.20	3.32
Latin America	91	0.00	0.02	0.00	0.00	**97.06**	0.00	0.00	0.04	2.88
Pacific	41	**66.79**	0.13	29.91	0.00	0.00	0.00	0.00	0.13	3.04
Investor Type										
Active	917	12.89	21.09	25.46	12.01	14.72	5.33	4.60	0.50	3.40
Passive	48	12.67	33.65	17.63	10.98	12.04	7.92	4.63	0.01	0.47

B. Bond Funds

		Average Weight (%)								
	Number of Funds	Developed Asia and Pacific	Developed Europe	Emerging Asia	Emerging Europe	Latin America	Middle East and Africa	North America	Other	Cash
Fund Target Region	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Global	81	10.62	**35.72**	3.78	2.42	4.21	0.90	29.74	3.44	8.55
Global Emerging	30	0.83	0.30	13.62	27.78	**43.42**	7.32	0.05	2.23	4.45
Investor Type										
Active	108	3.57	10.14	10.74	20.62	32.67	5.49	8.29	2.63	5.66
Passive	3	0.00	0.00	18.84	32.05	38.18	8.79	0.13	0.00	2.00

Appendix Table 3
Country Classification

This table presents the regional classification of countries provided by EPFR Global. Note that the weights for some of these countries may be always zero. Column (8) represents investments in other countries not covered by EPFR Global in both equity and bond funds.

Developed Asia and Pacific	Developed Europe	Emerging Asia	Emerging Europe	Latin America	North America	Middle East and Africa	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Australia	Austria	Cambodia	Albania	Argentina	Canada	Algeria	Other Fixed Income
Hong Kong	Belgium	China	Baltic Republics	Bolivia	U.S.	Bahrain	Other Equity
Japan	Denmark	India	Belarus	Brazil		Bangladesh	
New Zealand	Finland	Indonesia	Bosnia and Herzegovina	Chile		Botswana	
Papua New Guinea	France	Korea (North)	Bulgaria	Colombia		Congo-Kinshasa	
Singapore	Germany	Korea (South)	Croatia	Costa Rica		Egypt	
	Greece	Malaysia	Cyprus	Cuba		Gabon	
	Iceland	Mongolia	Czech Republic	Dominican Republic		Ghana	
	Ireland	Other Asia	Estonia	Ecuador		Iran	
	Italy	Pakistan	Georgia	El Salvador		Iraq	
	Netherlands	Philippines	Hungary	Guatemala		Israel	
	Norway	Sri Lanka	Kazakhstan	Jamaica		Ivory Coast	
	Other Europe	Taiwan	Latvia	Mexico		Jordan	
	Portugal	Thailand	Lithuania	Nicaragua		Kenya	
	Spain	Turkmenistan	Macedonia	Other Latin America		Kuwait	
	Sweden	Vietnam	Moldova	Panama		Lebanon	
	Switzerland		Poland	Peru		Libya	
	U.K.		Romania	Trinidad and Tobago		Malawi	
			Russia	Uruguay		Mauritius	
			Serbia and Montenegro	Venezuela		Morocco	
			Slovakia			Namibia	
			Slovenia			Nigeria	
			Tajikistan			Oman	
			Turkey			Other Middle East and Africa	
			Ukraine			Qatar	
						Saudi Arabia	
						South Africa	
						Swaziland	
						Tanzania	
						Tunisia	
						Uganda	
						United Arab Emirates	
						Yemen	
						Zambia	
						Zimbabwe	

Appendix Table 4
Country Weights in Mutual Funds (Country Examples)

Panel A reports the average weights of individual equity funds in each of the countries reported in the columns. Panel B reports the average weights of individual bond funds. Columns (2)-(9) are obtained by calculating the average weights within funds, and then obtaining the mean across funds. Funds are divided according to their target region.

A. Equity Funds

		Average Weight (%)							
	Number of Funds	Brazil	China	Germany	India	Japan	Russia	U.K.	U.S.
Target Region	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Asia Ex-Japan	201	0.00	11.16	0.00	5.22	0.03	0.00	0.07	0.00
BRIC	18	32.70	31.42	0.00	15.07	0.00	16.84	0.00	0.00
Emerg. Europe, Middle East, and Africa	38	0.00	0.00	0.00	0.00	0.00	5.35	0.21	0.00
Emerging Europe	91	0.00	0.00	0.00	0.00	0.00	46.14	0.00	0.01
Europe	143	0.00	0.02	17.73	0.08	0.00	0.14	15.11	0.06
Global	155	1.44	1.57	5.76	0.63	11.89	0.38	13.60	24.14
Global Emerging	187	13.04	8.42	0.00	6.94	0.00	5.77	0.06	0.00
Latin America	91	45.59	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Pacific	41	0.00	8.10	0.00	2.92	35.04	0.00	0.21	0.00
Investor Type									
Active	917	7.75	4.83	3.27	2.83	3.46	5.19	4.32	4.27
Passive	48	9.23	8.08	6.55	2.85	5.15	7.09	6.15	4.16

B. Bond Funds

		Average Weight (%)							
	Number of Funds	Brazil	China	Germany	India	Japan	Russia	U.K.	U.S.
Target Region	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Global	81	13.44	0.43	0.00	0.58	0.00	8.40	0.00	0.03
Global Emerging	30	1.16	0.00	8.48	0.06	11.11	1.18	9.43	24.76
Investor Type									
Active	108	10.53	0.38	2.48	0.39	2.33	7.58	2.11	7.79
Passive	3	7.50	0.00	0.00	0.00	0.00	7.54	0.00	0.13

Appendix Table 5
Coefficients of Variation in Mutual Funds

This table reports the coefficients of variation (CVs) in the target region, non-target region, and cash by funds investing in different areas of the world. The target region is the sum of country weights of countries that belong to that region in each fund type. The non-target region is 100, minus cash, minus the target region. Column (2) reports the CVs within the target region. The CVs within the target region are first calculated for each country, and then the median across countries is calculated for the target region. The means for the CVs in Columns (3)-(5) are obtained by calculating means of weights within funds, and then obtaining the average across funds. To calculate the coefficients across funds, the standard deviation is calculated across funds after obtaining the mean within funds. For the within funds coefficients, the standard deviation and the CVs are calculated within funds, and then averaged across funds.

	Number of Funds		Within Target Region	Target Region	Non-Target Region	Cash
	(1)		(2)	(3)	(4)	(5)
Equity Funds						
Asia Ex-Japan	201	Across Funds	0.83	0.11	1.82	#REF!
		Within Funds	0.44	0.05	0.45	#REF!
BRIC	18	Across Funds	0.24	0.05	1.97	#REF!
		Within Funds	0.10	0.02	0.54	#REF!
Emerg. Europe, Middle East, and Africa	38	Across Funds	2.05	0.74	0.48	#REF!
		Within Funds	0.37	0.13	0.13	#REF!
Emerging Europe	91	Across Funds	0.54	0.13	0.99	#REF!
		Within Funds	0.37	0.07	0.49	#REF!
Europe	143	Across Funds	1.10	0.04	1.31	#REF!
		Within Funds	0.55	0.03	0.60	#REF!
Global	155	Across Funds	1.57	0.07	0.66	#REF!
		Within Funds	0.61	0.05	0.41	#REF!
Global Emerging	187	Across Funds	0.66	0.04	1.56	#REF!
		Within Funds	0.53	0.03	0.68	#REF!
Latin America	91	Across Funds	0.62	0.04	1.08	#REF!
		Within Funds	0.49	0.04	0.73	#REF!
Pacific	41	Across Funds	0.89	0.07	0.94	#REF!
		Within Funds	0.39	0.04	0.44	#REF!
Bond Funds						
Global	30	Across Funds	2.09	0.19	0.56	#REF!
		Within Funds	0.66	0.08	0.22	#REF!
Global Emerging	81	Across Funds	1.23	0.14	1.35	#REF!
		Within Funds	0.44	0.05	0.35	#REF!

Appendix Table 6
Relevant Regional Classification

This table presents the target region classification used in this paper, following MSCI.

Asia Ex-Japan	BRIC	Emerg. Europe, Middle East, and Africa	Emerging Europe	Europe	Global	Global Emerging	Latin America	Pacific
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
China	Brazil	Czech Republic	Czech Republic	Austria	Argentina	Argentina	Argentina	Australia
Hong Kong	China	Egypt	Hungary	Belgium	Australia	Brazil	Brazil	China
India	India	Hungary	Poland	Czech Republic	Austria	Chile	Chile	Hong Kong
Indonesia	Russia	Morocco	Russia	Denmark	Belgium	China	Colombia	Indonesia
Korea (South)		Poland	Turkey	Finland	Brazil	Colombia	Mexico	Japan
Malaysia		Russia		France	Canada	Czech Republic	Peru	Korea
Philippines		South Africa		Germany	Chile	Egypt		Malaysia
Singapore		Turkey		Greece	China	Hungary		New Zealand
Taiwan				Hungary	Colombia	India		Philippines
Thailand				Ireland	Czech Republic	Indonesia		Singapore
				Italy	Denmark	Korea		Taiwan
				Netherlands	Egypt	Malaysia		Thailand
				Norway	Finland	Mexico		
				Poland	France	Morocco		
				Portugal	Germany	Peru		
				Russia	Greece	Philippines		
				Spain	Hong Kong	Poland		
				Sweden	Hungary	Russia		
				Switzerland	India	South Africa		
				Turkey	Indonesia	Taiwan		
				U.K.	Ireland	Thailand		
					Israel	Turkey		
					Italy			
					Japan			
					Korea			
					Malaysia			
					Mexico			
					Morocco			
					Netherlands			
					New Zealand			
					Norway			
					Peru			
					Philippines			
					Poland			
					Portugal			
					Russia			
					Singapore			
					South Africa			
					Spain			
					Sweden			
					Switzerland			
					Taiwan			
					Thailand			
					Turkey			
					U.K.			
					U.S.			

Appendix Table 7
Coefficients of Variation in Mutual Funds by Investment Strategy

This table reports the coefficients of variation (CVs) by type of fund in each geographical region and cash. All the CVs are computed with the same mean. This mean is calculated first within funds, and then across funds. The CVs across funds are obtained by first calculating the standard deviation within funds and then across funds. The CVs within funds are obtained by calculating the standard deviation and the CVs within funds, and then averaging across funds.

				Coefficients of Variation								
	Investment Strategy	Number of Funds		Developed Asia and Pacific	Developed Europe	Emerging Asia	Emerging Europe	Latin America	Middle East and Africa	North America	Other	Cash
Equity Funds	Active	917	Across Funds	1.46	1.65	1.10	2.23	1.94	2.92	2.87	2.94	1.12
			Within Funds	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	Passive	48	Across Funds	2.05	1.27	1.51	2.51	1.99	3.02	3.16	3.68	2.96
			Within Funds	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Bond Funds	Active	108	Across Funds	2.00	1.82	0.77	0.62	0.63	0.99	2.00	1.16	1.58
			Within Funds	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	Passive	3	Across Funds	-	-	0.20	0.03	0.04	0.06	1.73	-	1.04
			Within Funds	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Appendix Table 8
Behavior of Relative Flows

This table presents the results of ordinary least squares regressions of the difference of log country weights and log buy-and-hold weights on different variables. Panel A presents the results for equity funds and Panel B for bond funds. The "country crisis" variable is a dummy that indicates if a country has a banking, debt, or currency crisis during a given year. The "relative returns" variable is the difference between country net returns and fund net returns, expressed as decimals. Estimations are performed at different frequencies and include different combinations of fixed effects. Only countries in the target region are considered for each type of fund. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

A. Equity Funds

	Log Country Weights Minus Log Buy-and-Hold Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi-Annual	Annual
Log Lagged Weights	-0.014 ***	-0.018 ***	-0.017 ***	-0.101 ***	-0.099 ***	-0.099 ***	-0.432 ***	-0.693 ***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.012)	(0.026)
Relative Returns	-0.378 ***	-0.353 ***	-0.007	-0.402 ***	-0.041 ***	-0.044 ***	-0.143 ***	-0.433 ***
	(0.051)	(0.057)	(0.013)	(0.049)	(0.013)	(0.013)	(0.032)	(0.035)
Country Crisis						-0.02 ***	-0.069 ***	-0.118 ***
						(0.003)	(0.017)	(0.026)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	458,458	458,458	458,458	458,458	458,458	458,458	62,949	26,018
R-squared	0.018	0.023	0.120	0.079	0.174	0.174	0.384	0.545

B. Bond Funds

	Log Country Weights Minus Log Buy-and-Hold Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly						Semi Annual	Annual
Log Lagged Weights	-0.026 ***	-0.031 ***	-0.030 ***	-0.132 ***	-0.134 ***	-0.134 ***	-0.552 ***	-0.898 ***
	(0.002)	(0.003)	(0.003)	(0.008)	(0.009)	(0.009)	(0.037)	(0.059)
Relative Returns	-0.763 ***	-0.762 ***	-0.362 ***	-0.781 ***	-0.392 ***	-0.389 ***	-0.704 ***	-0.69 ***
	(0.091)	(0.091)	(0.079)	(0.084)	(0.073)	(0.073)	(0.101)	(0.100)
Country Crisis						-0.016	-0.017	-0.026
						(0.011)	(0.050)	(0.084)
Fund Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Fund-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Fund Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	39,183	39,183	39,183	39,183	39,183	39,183	5,035	1,959
R-squared	0.028	0.036	0.123	0.109	0.198	0.198	0.495	0.700

Appendix Table 9
Decomposition of Gross and Net Flows by Regions

This table presents the decomposition of gross and net flows into the growth rate of country weights and other terms for different regions. Panel A presents the decomposition of gross flows adjusting the weights for returns, while Panel B presents the decomposition of net flows without adjusting for returns. Shares are calculated as the median share of individual components for each country, averaged across time, and then averaged across all countries in each region. The variance decomposition is obtained by taking the variance of each individual component at the country level, and then averaging it across countries. Both gross and net flows are computed as the sum of the two terms in the decompositions. Since the two terms are not orthogonal, the covariance term is imputed equally to each component. Outliers are filtered by the share of the component associated with weights in each decomposition. Only observations within the 10th and 90th percentile of the share of this component are considered.

A. Gross Flows Adjusting Weights for Returns

	Shares (% of Gross Flows)		**Variance Decomposition (% of Variance of Gross Flows)**	
Region	Return-Adjusted Growth Rate of Weights	Other	Return-Adjusted Growth Rate of Weights	Other
All Countries	22.4%	77.6%	32.1%	67.9%
Asia	-1.4%	101.4%	5.7%	94.3%
Developed Countries	18.5%	81.5%	27.4%	72.6%
Non-emerging Developing Countries	46.5%	53.5%	61.4%	38.6%
Eastern Europe	29.6%	70.4%	43.6%	56.4%
Emerging Countries	-1.8%	101.8%	2.6%	97.4%
Latin America	21.0%	79.0%	32.4%	67.6%

B. Net Flows without Adjusting Weights for Returns

	Shares (% of Net Flows)		**Variance Decomposition (% of Variance of Net Flows)**	
Region	Growth Rate of Weights	Other	Growth Rate of Weights	Other
All Countries	78.0%	22.0%	77.4%	22.6%
Asia	76.7%	23.3%	66.1%	33.9%
Developed Countries	80.8%	19.2%	83.0%	17.0%
Non-emerging Developing Countries	78.6%	21.4%	80.7%	19.3%
Eastern Europe	73.5%	26.5%	71.8%	28.2%
Emerging Countries	74.0%	26.0%	66.9%	33.1%
Latin America	71.8%	28.2%	75.2%	24.8%