



# IMF Working Paper

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International Mutual Funds, Capital Flow Volatility, and  
Contagion—A Survey

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## **IMF Working Paper**

Western Hemisphere Department

International Mutual Funds,  
Capital Flow Volatility, and Contagion – A Survey<sup>1</sup>

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### **Abstract**

Gaining a better understanding of the behavior of international investors is key for informing the debate about the optimal response to capital flows and about reforms to the international financial architecture. In this context, recent research on the behavior of international mutual funds at the micro level has expanded our knowledge about the drivers of portfolio flows and the mechanisms behind the transmission of financial shocks across countries. This paper provides a brief survey of this literature, with a focus on the empirical evidence for emerging markets. Overall, the behavior of international mutual funds is complex and overly simplistic characterizations are misleading. However, there is broad-based evidence for momentum trading among funds. Moreover, funds tend to avoid opaque markets and assets, and this behavior becomes more pronounced during volatile times. Portfolio rebalancing mechanisms are clearly important in explaining contagion patterns, even in the absence of common macroeconomic fundamentals. From a surveillance point of view, this implies that monitoring the exposures of large investors at a micro level is crucial to assess vulnerabilities.

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## I. INTRODUCTION

One salient feature of financial globalization has been the growth of international mutual funds. To a significant extent, this reflects the fact that investors in mature markets have increasingly sought to diversify their assets by investing in emerging markets, often through so-called dedicated emerging market funds (which invest exclusively in emerging markets) or through increased emerging market participation by globally active funds. As noted by Eichengreen and Mussa (1998), this development has been facilitated by technological change, privatization in emerging markets, far-reaching deregulation of financial markets in industrial countries in the 1980s and early 1990s, the growth of institutional investors in advanced economies, and macroeconomic and trade reform in developing countries, which have rendered emerging markets more attractive.<sup>2</sup>

As a result, gross portfolio flows to emerging markets more than tripled from 1997 to 2009 (from US\$132 million to around US\$421 billion), with emerging market funds accounting for a significant fraction of those flows.<sup>3</sup> While these flows reverted temporarily during the global financial crisis in 2008, 2009 and 2010 again saw record flows from both equity and bond mutual funds (Table 1), with the assets under management of emerging market funds reaching unprecedented heights (Figure 1).<sup>4</sup>

Table 1. Mutual Fund Flows into Emerging Markets  
(In millions of U.S. dollars)

|                           | 2003   | 2004    | 2005    | 2006    | 2007    | 2008     | 2009    | Q110   | Q210    |
|---------------------------|--------|---------|---------|---------|---------|----------|---------|--------|---------|
| Bonds                     | 3153.3 | 1946.6  | 5729.0  | 6233.1  | 4294.9  | -14717.6 | 8275.7  | 7790.4 | 9288.8  |
| Equities                  | 8500.0 | 2783.6  | 21706.1 | 22440.8 | 40827.1 | -39490.0 | 64383.2 | 7570.8 | 9821.8  |
| Global                    | 2119.2 | -5348.3 | 3147.7  | 4208.6  | 15223.3 | -9114.1  | 34471.3 | 3748.6 | 9411.6  |
| Asia                      | 5148.4 | 5609.0  | 6951.8  | 16790.2 | 16404.6 | -19586.8 | 19108.6 | 1804.0 | 2109.8  |
| Europe/Middle East/Africa | 856.5  | 2184.9  | 7587.2  | -1877.4 | -953.3  | -4928.7  | 2017.3  | 1882.1 | 759.4   |
| Latin America             | 375.9  | 338.0   | 4019.5  | 3319.5  | 10152.6 | -5860.4  | 8786.0  | 136.1  | -2459.0 |

Source: *Global Financial Stability Report*, IMF.

The increased financial integration and ensuing international presence of institutional investors has brought benefits to both advanced and developing economies. However, it has

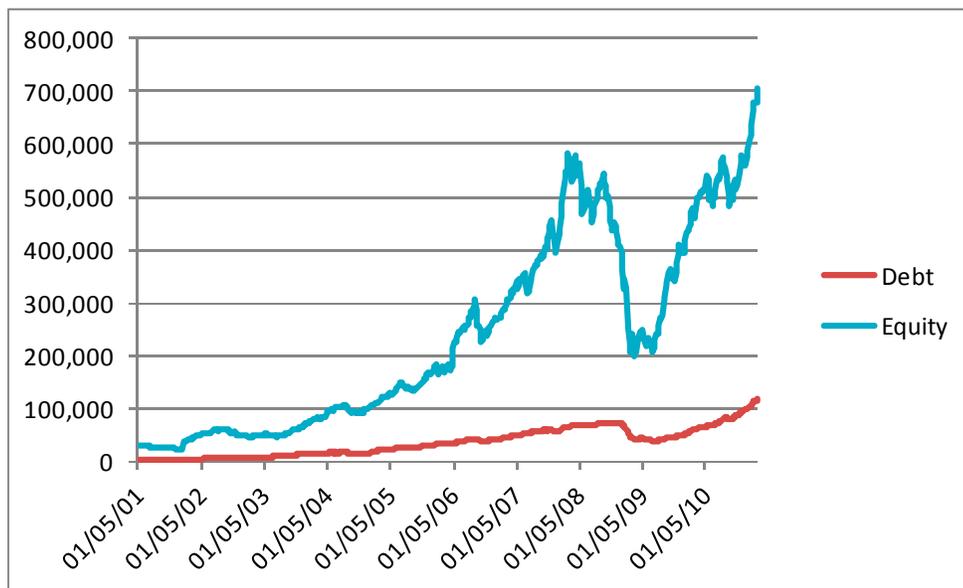
<sup>2</sup> See also Pazarbasioglu, Goswami, and Ree (2007) and Lane and Milesi-Ferretti (2008). Various of the issues discussed here are also treated in Frenkel and Menkhoff (2004).

<sup>3</sup> Portfolio flows, in turn, represented about 30 percent of total gross inflows into emerging markets in the first half of 2010 (see IMF, 2011a).

<sup>4</sup> Emerging market hedge funds have also played an —albeit less important—role in this context. In 2007, hedge fund flows to emerging market were estimated to have amounted to US\$ 9.1 billion (IMF, 2009).

also brought risks stemming from the volatility of these flows.<sup>5</sup> Prior to the recent global crisis, the recurrence of crises in emerging markets in the late 1990s and early 2000s had already put the spotlight on international investors. These investors were often seen as overreacting, engaging in momentum trading, exacerbating volatility, and aiding in transmitting crises across countries even in the absence of fundamental linkages (Aitken, 2007, Furman and Stiglitz, 1998).<sup>6</sup> These views, in turn, have figured prominently in the international policy debate on reforms to the international financial architecture (such as calls for the imposition of a Tobin tax).<sup>7</sup> The recent global crisis has again highlighted the volatility of international capital flows, and the current surge in flows to emerging markets has reignited the debate about the appropriate policy response.<sup>8</sup>

Figure 1. Emerging Market Debt and Equity Funds: Assets Under Management (US\$ million)



Source: Emerging Portfolio Fund Research.

<sup>5</sup> For a discussion of the benefits and costs of financial integration more generally, see Kose, Prasad, Rogoff, and Wei (2010).

<sup>6</sup> It has been argued that this type of behavior in emerging markets can be more accentuated for so-called crossover funds (i.e. funds who invest mainly in advanced economies but allocate opportunistically in emerging markets) than in so-called dedicated funds who specialize in emerging markets. See Ong and Sy (2004).

<sup>7</sup> For definitions of financial contagion and a review of the contagion literature, see Pritsker (2010), and Kaminsky, Reinhart, and Vegh (2003), respectively. See Duffie (2010) for a more general discussion of asset price dynamics of asset prices in settings in which only a subset of investors react to trading opportunities.

<sup>8</sup> See Milesi-Ferretti and Tille (2010) for a recent analysis of capital flows during the global financial crisis and IMF (2011b) for a recent discussion of policy issues related to capital flows.

Table 2. Global Emerging Market Equity Funds: Assets Under Management<sup>9</sup>  
(By region, in US\$ million)

|      | Asia    | LatAm  | EMEA   |
|------|---------|--------|--------|
| 2001 | 9,538   | 1,867  | 2,882  |
| 2006 | 113,235 | 21,979 | 42,004 |
| 2010 | 208,717 | 50,040 | 38,913 |

Source: Emerging Portfolio Fund Research.

Designing the optimal policy response to capital flows, however, presupposes a good understanding of the nature of these flows. In this context, over the past decade, a growing body of academic research has studied both at a theoretical and empirical level the behavior of international institutional investors to assess whether it can help understand international financial contagion and financial volatility phenomena. The empirical work in this area has benefitted from previously unavailable disaggregated data which allow for the testing of behavioral hypotheses at the microeconomic level. Here, we provide a short survey of this literature, with a focus on emerging markets, and an emphasis on the empirical evidence.

## II. PORTFOLIO CHOICE, FUND MANAGERS' INCENTIVES, AND CONSEQUENCES FOR CAPITAL FLOWS

### A. Theoretical Considerations

Can a better understanding of the microeconomics of asset management and portfolio choice shed light of phenomena of capital flow volatility and contagion? In examining this question, the literature has largely focused on the role of incentive structures for fund managers, portfolio restrictions (such as short-sale constraints), wealth effects, and informational cascades.

The compensation of mutual fund managers is typically linked to the performance of their portfolios relative to benchmark indices, such as the Morgan Stanley Capital International (MSCI) indices for equities in emerging markets and JP Morgan's Emerging Market Bond Indices (EMBI) indices for bonds.<sup>10</sup> Among other things, this may create an incentive for fund managers to follow their peers.

<sup>9</sup> Global funds are funds that invest worldwide, in contrast to regional or country funds.

<sup>10</sup> Even when compensation is not directly linked to a benchmark index, there is evidence that mutual fund inflows and redemptions are related to relative performance. See the discussion in Broner, Gelos, and Reinhart (2006). For a discussion of the incentives of domestic U.S. funds see for example Chevalier and Ellison (1997) or Daniel and Wermers, 2001, among many others). Basak and Pavlova (2011) provide a recent discussion of

(continued...)

Models of herding behavior (investors taking decisions which they would not take if they did not observe other investors taking them) therefore often build on benchmark-based compensation schemes<sup>11</sup>. Alternatively, herding is explained by informational learning (cascades).<sup>12,13</sup> Informational cascades occur when actions are observable but information is partly private or costly to acquire. In such situations, investors' actions provide valuable information to others, and in some cases it may be optimal for individual investors to completely disregard their own private information and to just imitate the behavior of their peers.

For example, Calvo and Mendoza (2000) describe fund managers' investment decisions using a mean-variance framework with short-selling constraints, including fixed costs of information acquisition about countries and assuming that fund managers' performance schemes create incentives against deviating too much from benchmark indices. In this setup, financial globalization can increase contagion risk as fund managers tend to rely on the actions of others.

Moreover, incentives related to compensation relative to benchmarks can interact with wealth effects, changes in risk aversion and portfolio constraints so as to explain contagion across countries even in the absence of fundamental linkages. To see this latter point, consider a situation where fund managers hold different portfolios because they have different beliefs about expected dividends. As Broner, Gelos, and Reinhart (2006) describe in a simple set up, when returns of a particular fund are low relative to the benchmark, its fund manager will become more risk averse, reducing the fund's weight in countries to which it was overexposed, and thereby adjusting its portfolio in the direction of the average portfolio (i.e. the benchmark). Suppose now that a crisis occurs in one country; funds that were overexposed to that country and therefore suffered losses, will want to reduce holdings in other countries they were "overweight" in. Consequently, the model suggests that a crisis in one country is more easily transmitted to countries that share optimistic (i.e. overexposed) investors with the crisis country.<sup>14</sup>

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why institutional investors optimally tilt their portfolios toward stocks that form part of their benchmark index, and its consequences for asset prices.

<sup>11</sup> See Scharfstein and Stein (1990) or Calvo and Mendoza (2000).

<sup>12</sup> See Devenow and Welch (1996) for an overview of rational herding models and Bikhchandani and Sharma (2001) for a survey of the theoretical and empirical literature. Gelos (2004) provides a similar discussion to the one presented here. See also Belke and Setzer (2004).

<sup>13</sup> Not all investors can trade in the same way since there must be a sale for every purchase. Therefore, herding can only meaningfully be defined for a subset of investors. The group of international mutual funds represents such an economically meaningful subset of investors. Investors may appear to behave like a herd if they react simultaneously to the same fundamentals. In this case, their behavior speeds up the adjustment of prices and is not destabilizing (Lakonishok, Shleifer, and Vishny, 1992). In an efficient market, however, price adjustment should occur quickly. See Borensztein and Gelos (2003a).

<sup>14</sup> See Chakravorti and Lall (2004) for a similar mechanism.

This mechanism could also help explain momentum trading (buying past winners and selling past losers)<sup>15</sup>: the reason is that when returns in a country are low, funds which are overexposed to that country tend to have below average gains. Therefore, they reduce their exposure to all countries in which they are overexposed, including the affected country. Similarly, funds with above-average gains further reduce their exposure to countries in which they are underexposed, including the affected country. Both effects yield positive feedback trading in the aggregate.

Similarly, in a model developed by Ilyina (2005), funds which are evaluated against benchmarks and are subject to short-sale constraints can potentially transmit (negative) shocks across fundamentally unrelated markets, while absolute-return-driven funds do not transmit negative shocks. An important implication of her analysis is that opportunistic investors (such as hedge funds) can play a stabilizing role in asset markets when other market participants with significant market power face tight investment restrictions.

A variety of other models have tried to explain contagion as a result of portfolio reallocation that is not directly related to common fundamentals across countries. Schinasi and Smith (2000) highlight that contagion effects can be the result of simple portfolio rebalancing within a mean-variance or VaR framework. In Kodres and Pritsker (2002), investors transmit idiosyncratic shocks from one market to others by rebalancing their portfolios' exposures to common macroeconomic risks. Kyle and Xiong (2001) model contagion as a wealth effect in a set up with two risky assets and different types of traders. Wealth effects as a source of contagion are also a feature of various other models, e.g. Goldstein and Pauzner (2004) and Yuan (2002)).<sup>16</sup> Pavlova and Rigobon (2007) construct a general equilibrium model in which portfolio constraints generate wealth transfers between the “periphery countries” and the center, which increase the comovement of stock prices across the periphery.

Taking into account the fact that the behavior of open-end funds reflects a combination of both actions by retail or institutional investors investing in such funds as well as those of the fund managers reacting to redemptions and inflows, adds an additional layer of complexity to the analysis (see Kaminsky, Lyons, and Schmukler, 2004). For example, pension funds or individual investors that invest a fraction of their assets in emerging market funds may be subject to investment restrictions or other constraints. Fund managers will have to take their behavior into account when deciding in which markets to invest (implying inter alia a preference for more liquid markets and assets), and how to react to shocks.

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<sup>15</sup> See DeLong and others (1990), Lakonishok, Shleifer, and Vishny (1992), or Chan, Jegadeesh, and Lakonishok (1996).

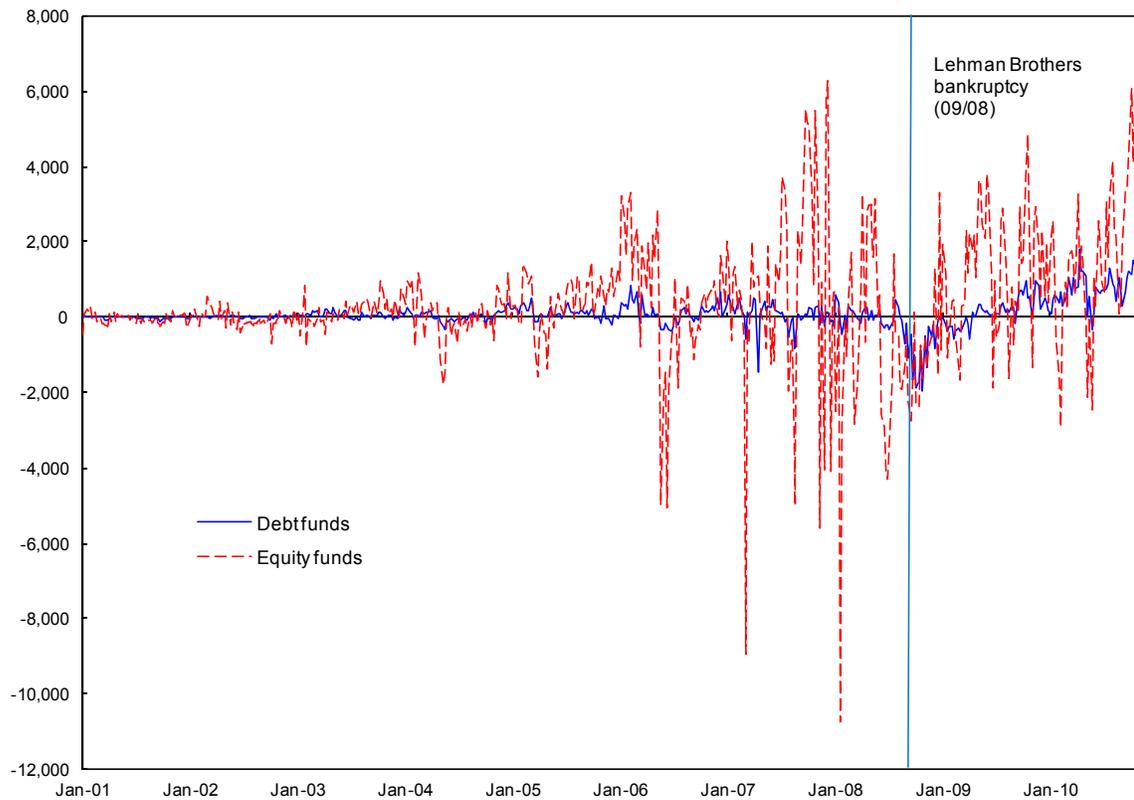
<sup>16</sup> See Pritsker (2010) for a discussion of wealth effects the transmission of shocks across financial markets.

## B. Empirical Evidence

### Aggregate patterns

The discussion above highlights the relevance of examining both flows in- and out of funds as well as the actions of the funds themselves. The funds' flows in- and out of emerging market are relatively volatile (Figure 2). Interestingly, the volatility of these flows already rose sharply about 1 ½ years before the Lehman collapse.

Figure 2. Weekly Flows into Emerging Market Debt and Equity Funds (US\$ million)



Source: Emerging Portfolio Fund Research.

Mutual funds themselves move actively in- and out of countries during turbulent times, but there is substantial heterogeneity across funds, with large outflows coinciding with large inflows.<sup>17</sup> Using mostly aggregate data about funds at a quarterly frequency, Kaminsky, Lyons and Schmukler (2001), provide a descriptive overview of the behavior of emerging market funds around crises, showing that fund flows around these events were quite unstable.

<sup>17</sup> See also Gelos (2004).

Similarly, Borensztein and Gelos (2003a) examine the behavior of emerging markets worldwide using monthly data. They highlight that on average, mutual funds fled crisis countries one month prior to the crisis while Didier, Mauro, and Schmukler (2008) point out that in 4 out of 7 examined crises, at the aggregate, funds were still buying assets 3 months prior to the crisis. Rea (1996), using quarterly data aggregated across 13 U.S. emerging market funds around the Mexican crisis, argues that their behavior was stabilizing rather than destabilizing.

Borensztein and Gelos (2003b) provide evidence on the differential behavior of closed-end and open-end funds and between single-country and diversified funds. Open-end funds faced with redemptions seek to react more strongly during crises, withdrawing more strongly from vulnerable countries than their closed-end counterparts.

In sum, a look from an aggregate perspective already reveals that any simplistic characterization of the behavior of these funds is likely to be misleading; while there is volatility both at the level of the flows in- out of these as well as in the funds' movements in- and out of countries, emerging market funds do not move in tandem as a single herd. On the other hand, *prima facie* they do not seem to operate as contrarian investors, either.

### **Herding**

An intuitive way of measuring the extent of herding behavior as co-movement in trading has been proposed by Lakonishok, Shleifer, and Vishny (1992). The idea is to assess whether funds move in the same direction more often than one would expect if they traded independently and randomly. The statistic, denoted HM (for herding measure), is given by:

$$HM_{it} = |p_{it} - E[p_{it}]| - E|p_{it} - E[p_{it}]|, \quad (1)$$

where  $p_{it}$  is the proportion of all funds active in country  $i$  in month  $t$  that are buyers:

$$p_{it} = \frac{\#ofBuyers(i,t)}{\#ofBuyers(i,t) + \#ofSellers(i,t)}, \quad (2)$$

and  $E[p_{it}]$  is its expected value. By taking the absolute value, the first term in equation (3) captures imbalances in both directions, buying or selling. The expected fraction of buyers  $E[p_{it}]$  may vary over time—for example, there might be periods of large inflows into emerging market funds as a whole, with corresponding purchases by funds across markets. Various modifications to the measure have subsequently been proposed (see Frey, Herbst, and Walter, 2007, Patterson and Sharma, 2006, or Wermers, 1999.) Other measures focus on the distribution of equity returns (see, for example, Christie and Huang, 1995).

There is some evidence for herding among international mutual funds, although the overall picture is somewhat ambiguous. Various studies have focused on the Korean market. Choe, Kho, and Stulz (1998) study transaction data from the Korean stock market during the crisis and find evidence for herding among foreign investors before the crisis, but no evidence for a

destabilizing effect of foreign investors over the entire sample period. Kim and Wei (2002a) examine the transactions of different types of portfolio investors in Korea before and during the Asian crisis, finding that herding is more widespread among individual and nonresident investors than among institutional and resident investors. In another study, Kim and Wei (2002b) compare the trading behavior on the Korean market by offshore investment funds with that of funds registered in the United States and the United Kingdom, finding herding behavior less prevalent among offshore funds. Due to the availability detailed data, the Taiwanese stock market has also been subject of various studies. For example, Jeon and Moffet (2010) find evidence of a significant impact of foreign investor herding on stock returns.<sup>18</sup> Lin, Tsai, and Sun (2010) find that herding tends to occur in trading of high-cap, high turnover stocks, which appears to contradict the predictions of the information cascade hypothesis.

Examining flows of funds active in emerging markets around the world, Donohue and Froot (2002) document a pattern of persistence of equity flows which they consider consistent with a contagion hypothesis. Using monthly data on the country asset allocation of dedicated emerging market equity funds, Borensztein and Gelos (2003a), find moderate, but statistically significant evidence for herding. The mean of *HM* across countries and over time is 7.7 percent, about twice as large as the number found for domestic U.S. institutional investors. More recently, using a different approach, Hsieh et al (2011) report evidence for herding behavior among funds investing in Asian markets during the period 1996-2004. The degree of herding, however, varies across countries and over time and in particular emerges only during and after crises.

Herding seems to be driven more by the behavior of individual investors rather than by fund managers. Consistent with the notion that fund behavior can largely be traced to redemptions by individual investors, Borensztein and Gelos (2003a) report herding to be more pronounced for open-end funds (which are subject to redemptions) than closed-end funds (which are not).<sup>19</sup> Moreover, open-end funds' flows Granger-cause closed-end funds investments, possibly because the closed-end funds are forced to follow the fickle open-end funds. This is consistent with the findings of Chan-Lau and Ong (2005) who report that investment decisions by fund managers seem to be largely driven by retail investor allocations.

Overall, most research has found some degree of herding among mutual funds in emerging markets. What is less clear is the quantitative significance of this behavior, and its magnitude compared to that of other types of investors.

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<sup>18</sup> See also Chiao, Hung, and Lee (2011) and Chang (2010).

<sup>19</sup> Borensztein and Gelos (2003b) find that open-end funds withdraw more from vulnerable countries around crises than their closed-end counterparts.

### **Momentum trading**

Overall, the evidence supports the notion that mutual funds engage in momentum (positive-feedback) trading, although its quantitative importance is not fully clear. Kaminsky, Lyons, and Schmukler (2004) investigate trading strategies for 13 U.S. funds investing in Latin America, reporting evidence on momentum strategies both at the fund manager and individual investor level. Patru (2006), examining flows into U.S.-based international mutual funds, finds evidence for return chasing among individual investors. Borensztein and Gelos (2003a) report moderate evidence for momentum trading among emerging market funds, which is more pronounced in the sell- than in the buy side, but not stronger during crises. In their study on Korea, Kim and Wei (2002a) find that nonresident institutional investors were always positive feedback traders while resident investors were contrarian traders before the crisis but became positive feedback traders during the crisis. Froot, O'Connell, and Seasholes (2001) find clear evidence for positive feedback trading among international mutual funds. Jotikasthira, Lundblad, and Ramadorai (2009), employing monthly data from 1996 to 2008 on over 1000 funds, also report evidence consistent with momentum trading. In their study of mutual fund flows into 12 Asian markets, Hsieh et al (2011) argue that positive feedback effect is stronger for volatile markets, and during and after crises.

Richards (2005) analyzes data on the aggregate daily trading of all foreign investors in six Asian emerging equity markets and finds that foreigners' flows into several markets show positive-feedback trading with respect to global, as well as domestic, equity returns. In particular, foreigners tend to be buyers on the day after rises in these markets or in US markets. Moreover, the price impact associated with foreigners' trading is quite large. More recently, Jinjarak and Zheng (2009) examine weekly flows of emerging market funds, finding that individual investors engage in positive feedback trading, by directing money toward funds that have performed well in the recent past.

Consistent with the notion that momentum trading is also important in the fixed-income market, in a study examining the holdings of emerging market mutual funds that specialize in sovereign bonds, Xiao (2007) reports evidence that these funds prefer bonds with high past returns and yields. By contrast, Curcuru et al. (2010) do not find evidence for return chasing among U.S. equity investors investing abroad once changes in wealth are controlled for.

### **Portfolio Rebalancing and Contagion**

Using micro data on fund allocations, Disyatat and Gelos (2001) empirically explore the extent to which a mean-variance model with short-sale constraints and benchmark-following explains the portfolio choice of emerging market funds. Specifically, they use a model as described in Roll (1992), where fund managers are concerned about the tracking error (the variance of deviation from the benchmark return), and add a short-sale restriction. The authors find that the model provides a reasonable approximation to the asset allocation of these funds.

When deriving the expected returns implicit in funds' holdings through reverse optimization—using the model and historical covariances—they find that these are strongly correlated with actual future returns. This implies that funds are good at predicting returns. Funds who deviated more from benchmark indices tended to have excess returns. The findings do not seem to be driven by price pressures associated with funds' flows on emerging markets' returns. By contrast, when using historical returns as proxies for expected returns, the model does poorly compared to simple benchmark indices.

In a study of closed-end country funds, Frankel and Schmukler (1998) examine how the Mexican crisis was transmitted to other markets studying fund net asset values and fund prices, which are quoted in local stock markets and New York, respectively. While changes in net asset values in Mexico are transmitted directly to other Latin American markets, for Asia, spillovers appear to occur through fund prices in New York. This per se does not provide evidence for any particular portfolio channel of contagion, but it is consistent with the notion that international investors holding assets in New York aimed at a readjustment in their overall portfolios in response to the shock.

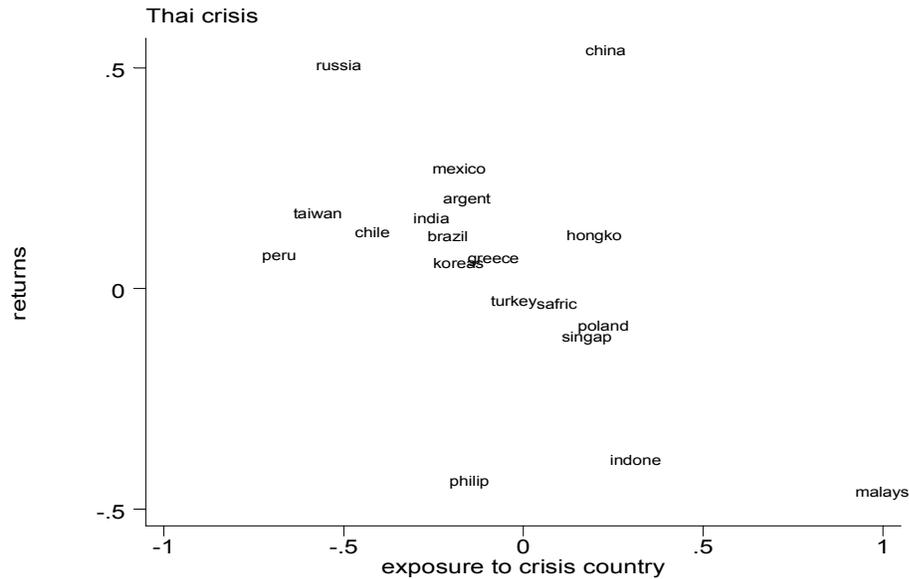
In a related vein, Boyer, Kumanagai, and Yuan (2006) separate emerging market stocks into two categories, those that are eligible for purchase by foreigners and those that are not, and compare the degree to which accessible and inaccessible stock index returns co-move with crisis country index returns. They find higher comovement among accessible stock returns, suggesting that crises spread through the asset holdings of international investors rather than through changes in fundamentals.

Jotikasthira, Lundblad, and Ramadorai (2009), using data from developed-country-domiciled mutual and hedge funds, find that inflows and outflows experienced by these funds translate into significant changes in their portfolio allocations in emerging markets. They also find that these portfolio shifts substantially impact emerging market equity returns, and are associated with increases in co-movement between emerging and developed markets.

Kaminsky, Lyons, and Schmukler (2004), examining quarterly data on 13 Latin American mutual funds, find that they sell (buy) assets from one country when asset prices fall (rise) in another. Based on monthly data on a large sample of emerging market funds, Broner, Gelos, and Reinhart (2006) construct an index of financial interdependence reflecting the extent to which countries share “overexposed” funds, finding that this index contributes to explain the pattern of stock returns during three crises. In the case of the Thai crisis, it outperforms trade and bank linkages as an explanatory variable, while for the Russian and Brazil crises, trade linkages seem to be at least as important in explaining the extent to which other countries were affected (Figure 3).

In sum, there is empirical evidence supporting the notion that benchmark-following and portfolio rebalancing by fund managers plays a role in transmitting shocks across financial markets, even in the absence of common macroeconomic fundamentals.

Figure 3. Common Investors as Predictor of Contagion: The Thai Crisis



Note: The x-axis measures financial exposure to Thailand through common “overexposed” emerging market funds (prior to the Thai crisis), and the y axis shows stock market returns of the respective country during the Thai crisis. Source: Broner, Gelos, and Reinhart (2006).

### III. TRANSPARENCY, INFORMATIONAL ASYMMETRIES, ASSET ALLOCATION, AND CAPITAL FLOW VOLATILITY

It has frequently been argued that increasing transparency (defined as the availability and reliability of information) can both be beneficial in attracting investment while helping to avoid excessive capital flow volatility (see, for example, IMF 2001, Frenkel and Menkhoff, 2004, and Gai, 2003).

#### A. Transparency and Asset Allocation

There is reason to believe that opacity of a country’s markets and assets may not simply reduce prices but induce ‘outsiders’ (such as foreign investment funds) to shy away from them. Stulz (1981) develops an equilibrium model in which costs associated with holding foreign assets can induce investors to hold fewer foreign assets.<sup>20</sup> Similarly, at the corporate level, Diamond and Verrechia (1991), among others, have argued that a reduction in informational asymmetry can increase investments by large investors and reduce the firm’s cost of capital (see Healy and Palepu, 2001, Core, 2001, and Beneish and Yohn, 2008, for reviews of the literature on the effects of corporate disclosure). In a different strand of the

<sup>20</sup> See also the discussion in Leuz, Lins, and Warnock (2006).

literature, insider trading models suggests that “outsiders” will reduce their investment if they expect “insiders” to take advantage of them in trading (Ausubel, 1990).

### **B. Transparency and Volatility**

The literature explicitly modeling the link between transparency of emerging markets and volatility is still limited. Models like the one of Calvo and Mendoza (2000) suggest that information asymmetries can play an important role in shaping the degree of volatility of foreign investor flows. More generally, models of herding that rely on informational cascades suggest that herding should be less prevalent in more transparent markets.

Chari and Kehoe’s (2003) present a model in which only countries with weak reputations suffer capital flow volatility as investors fear expropriation. Pasquariello (2007) develops a framework in which lower information heterogeneity (i.e. more transparency) within a market induces less incorrect inference about its liquidation values, hence making that market less vulnerable to external idiosyncratic shocks.

### **C. Empirical Evidence**

There is evidence that foreign investors indeed tend to avoid less transparent markets and assets. Using security-level data on U.S. investors’ holdings, Leuz, Lins, and Warnock (2008) find that foreigners invest less in firms residing in countries with poor outsider protection and disclosure and which have ownership structures that are conducive to governance problems.<sup>21</sup> This effect is particularly pronounced when earnings are opaque, indicating that information asymmetry and monitoring costs faced by foreign investors are the likely explanation for the results.

Giannetti and Koskinen (2007) report that mutual funds invest more in countries with better investor protection. Similarly, Aggarwal, Klapper, and Wyszocki (2005) and Chan, Covrig and Ng (2005) find that U.S. mutual funds prefer emerging markets with stronger accounting standards, shareholder rights and legal frameworks. Ferreira and Matos (2008) show that institutions reveal a preference for stocks of countries with strong disclosure standards. Gelos and Wei (2005), using various measures of government and corporate opacity, also find that emerging market mutual funds prefer to invest in more transparent countries (Figure 5).

Didier (2011) points out that differences in the mandates of global versus specialized mutual funds imply different costs and benefits in gathering and processing information and finds

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<sup>21</sup> See also Lee et al. (2003) as another example linking international investor decisions to corporate governance. Another strand of the literature has linked the degree of financial market segmentation to informational barriers using data on prices. See, among others, Bekaert et al. (2009) or Carrieri et al (2007).

that global funds tend to hold more assets from firms that are less prone to informational asymmetries.<sup>22</sup>

Didier, Rigobon, and Schmukler (2011) study a comprehensive set of data on U.S. based International Funds, finding that funds hold a relatively small number of stocks, which appears inconsistent with diversification objectives. The authors, however, argue that the pattern is not explained by a lack of information.

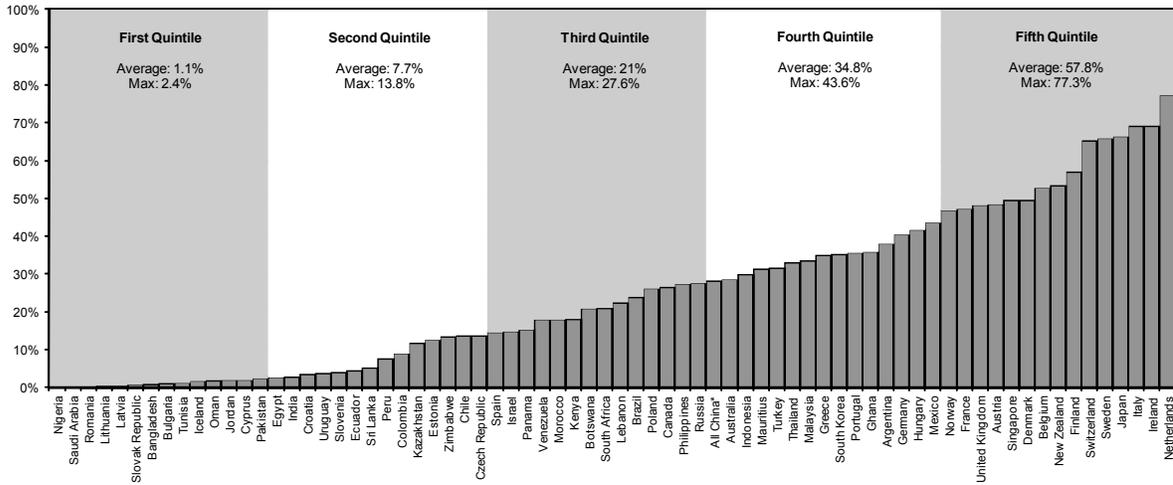
There is also some evidence that more transparency may reduce the volatility of mutual fund flows. Gelos and Wei (2002) report that during crises, funds tend to flow more from less transparent countries and that herding is more pronounced in less transparent markets. Gande and Parsley (2006), using the same data on emerging market funds, find that less corrupt countries are less vulnerable to downgrades by rating agencies, as measured by mutual fund outflows.

What do the results on opacity imply for the question of whether foreign funds are better or worse informed than local investors in emerging markets? Brennan and Cao (1997) argue that foreign investors suffer from informational disadvantage vis-à-vis domestic investors. In a study of Mexican corporate news announcements, Bhattacharya, Daouk, Jorgenson, and Kehr (2000) provide evidence consistent with this hypothesis. Similarly, Frankel and Schmukler (2000) show that before the 1994 crisis, Mexican investors turned pessimistic before foreigners. The evidence presented in Gelos and Wei (2005) indicates that foreign investors seem to—other things equal—prefer more transparent markets because they fear being taken advantage of by insiders. Using transaction data from the Jakarta Stock Exchange, Dvorak (2005) finds evidence indicating that domestic investors have an informational advantage over foreigners, including that foreign investors systematically buy at a higher and sell at lower intra-day prices than domestic investors.

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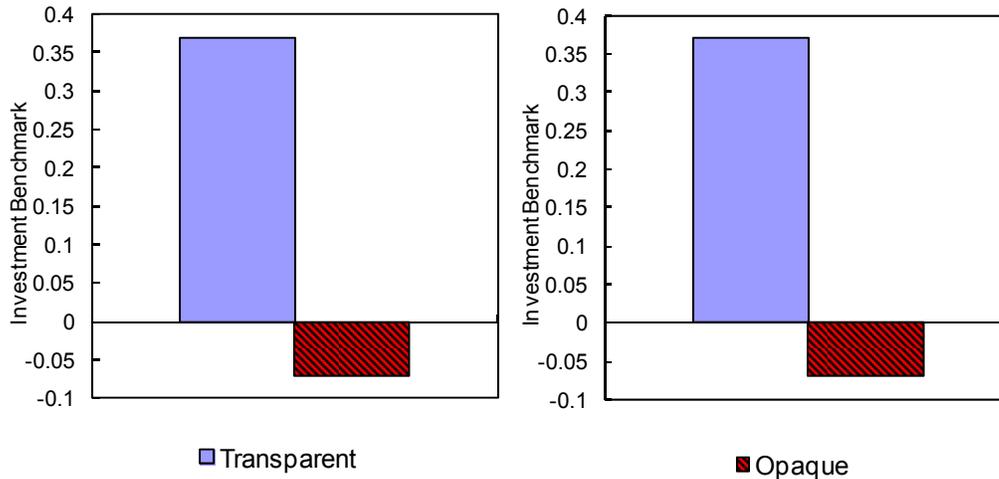
<sup>22</sup> Hau and Rey (2008) find a large heterogeneity in the degree of home bias across mutual funds, a positive correlation between the size of funds and home bias; and a positive correlation between the size of funds, the number of foreign countries and the number of sectors in which they invest.

Figure 4. Mutual Fund Holdings as a Proportion of the Total Number of Listed Stocks by Country



Source: Didier, Rigobon and Schmukler (2011). Figure shows the total number of stock holdings for all U.S. mutual funds in their sample as a percentage of the total number of listed stocks by country. Countries are sorted according to their average ratio in the 1997-2004 period. Countries are divided into five groups (quintiles) and the average and maximum values for each quintile are reported. The U.S. is excluded from the figure. The data for the total number of listed stocks come from the Global Financial Database. \* "All China" includes the following economies: Mainland China, Hong Kong, and Taiwan POC.

Figure 5. Difference Between Actual International Mutual Fund Investment and the MSCI Benchmark: Transparent versus Opaque Countries



Source: Author's calculation based on Gelos and Wei (2005).

Various studies, however, suggest that foreign funds do well in emerging markets. Finance practitioners often use mutual fund flows to help predict returns in emerging markets (see for example, Deutsche Bank, 2006).<sup>23</sup> Seasholes (2000) reports that foreign investors earn

<sup>23</sup> A related question concerns the impact of foreign institutional purchases' on local equity prices. Most studies find support for the notion that foreign investor flows have an impact on prices (see, among others, Jotikasthira, Lundblad, and Ramadorai (2009)) but the evidence is not conclusive (see, for example, the IMF's Global Financial Stability Report, September 2007).

economically significant profits in emerging equity markets, and the evidence presented in Disyatat and Gelos (2001) and Borensztein and Gelos (2003b) (funds exit countries prior to crises) supports this view. Froot and Ramadorai (2008), examining the response of prices and net asset value returns to cross-border flows, find evidence consistent with the notion that foreign investors have better information than local investors.<sup>24</sup> Similarly, Tkac (2001) shows that a large percentage of international funds based in the U.S. outperform their passive benchmarks in a statistically significant manner, while Choe, Kho, and Stulz (2001) and Eling and Faust (2010) present a more mixed picture. Huij and Post (2008) report that emerging market funds generally display better performance than US funds, and Polwittoon and Tawatnuntachai (2008) provide evidence for good performance of emerging market bond funds. Similarly, Rodriguez (2007) argues that Latin American fund managers demonstrate forecasting ability as evidenced by a positive and statistically significant attribution return.<sup>25</sup>

These findings could be reconciled if foreigners were at an informational disadvantage about domestic conditions (thereby avoiding opaque markets) but at an advantage regarding global factors, as argued in Albuquerque, Bauer, and Schneider (2009).<sup>26</sup> Such an explanation would also be consistent with, on the one hand, a relatively poor stock-picking ability of emerging market mutual funds (Rodríguez and Torrez, 2010), and, on the other hand, their relatively good timing ability.

#### IV. CONCLUSIONS

Understanding the behavior of international investors is key for informing the debate about the optimal response to international capital flows and about reforms to the international financial architecture. In this context, recent research on the behavior of international mutual funds at the micro level has improved our understanding of the drivers of international portfolio flows and the mechanisms behind the transmission of financial shocks across countries. Among the lessons learned are:

- Overall, the behavior of international mutual funds is complex and overly simplistic characterizations are misleading.
- International funds tend to avoid opaque markets and assets. This behavior becomes more pronounced during volatile times, and funds tend to flee less transparent countries during crises.

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<sup>24</sup> Aggarwal and Jorion (2010) argue find strong evidence of outperformance of emerging market hedge funds during the first two to three years of existence.

<sup>25</sup> See Banegas (2010) for evidence on the economic value of active management among emerging market funds.

<sup>26</sup> Consistent with this view, Thomas, Warnock, and Wongswan (2006) find that U.S. investors show good asset allocation but not trading abilities in international equity markets. See also Dumas, Lewis, and Osambela (2011) for a model in which domestic and foreign investors differ in the interpretation of signals.

- The fact that emerging market mutual funds find it more difficult to overcome local opacity does not imply that, overall, they are at an informational disadvantage: the evidence tends to suggest that these funds perform relatively well, possibly because they are better informed about global factors.
- Portfolio rebalancing mechanisms are clearly important in explaining contagion patterns, even in the absence of common macroeconomic fundamentals.
- Volatility of capital flows is to some extent driven by investors investing in emerging market funds rather than behavior at the level of the fund manager.
- Momentum trading is present among mutual funds.
- There is also some evidence for herding. However, its quantitative importance is not fully clear. Clearly, funds do not all move together in the same ways.
- Most studies suggest that portfolio changes by emerging market equity funds have an impact on market returns.

From a surveillance point of view, this implies that monitoring the exposures of large investors at a micro level is important to be able to predict vulnerabilities. One challenge which has been dramatically highlighted during the recent financial crisis is the need to consolidate existing diverse sources of information on investors' portfolio holdings so as to improve the ability to predict the transmission of volatility across countries.

From a policy perspective, the evidence supports the notion that increasing transparency— i.e. providing more frequent, comprehensive, and reliable information— could help emerging markets mitigate some of the risks associated with financial globalization.

Much more research is needed to understand the increasingly complex interaction between different types of international investors in emerging markets. While mutual funds represent an important group of investors, pension funds and hedge funds have been allocating growing shares of their assets in emerging markets, a trend that is unlikely to wane soon. Little is understood so far about the interplay between the different incentives and constraints faced by the managers of these funds, and filling this gap is an important challenge for further research.

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