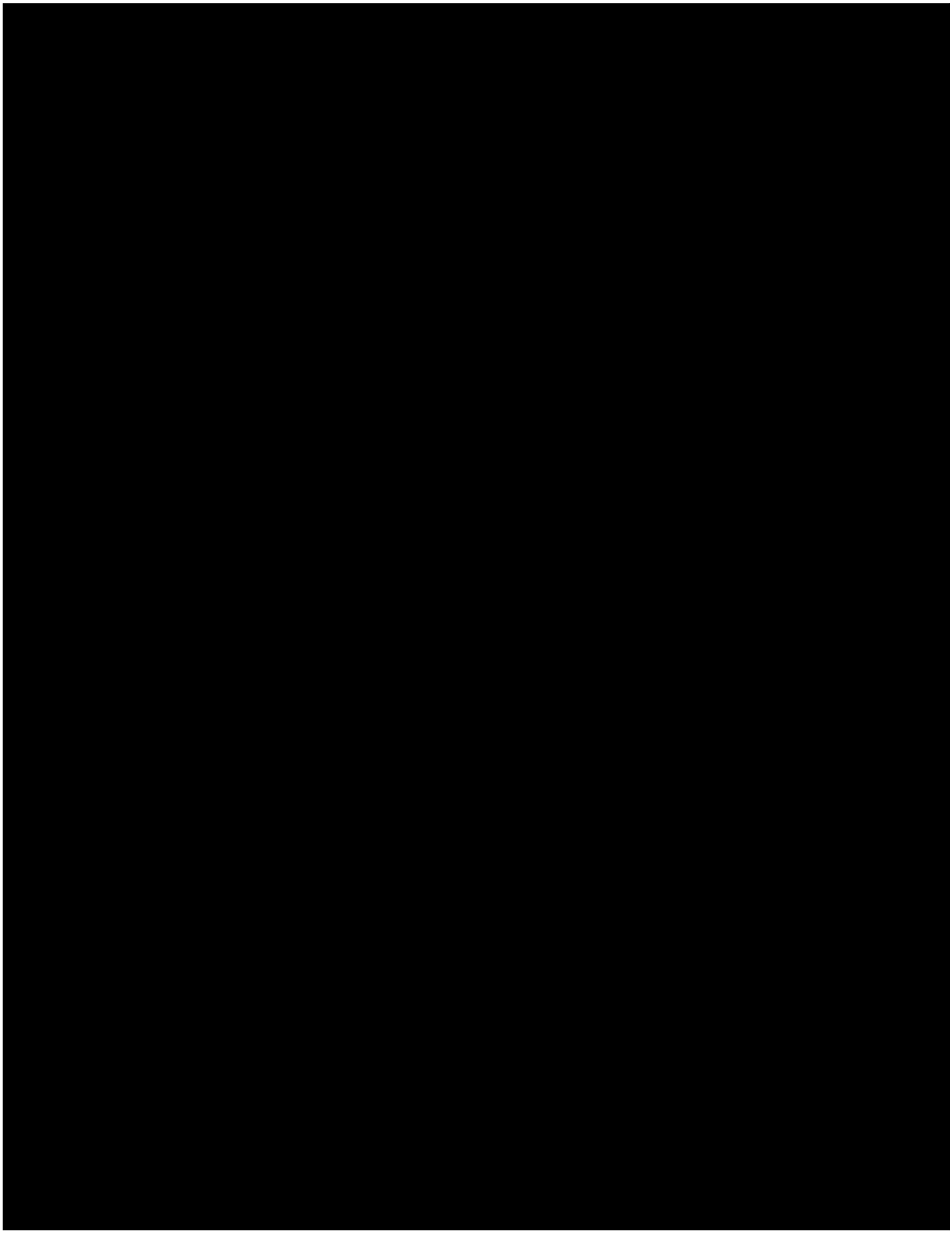

 WP/15/277

IMF Working Paper

Monetary and Capital Markets Department

Changes in the Global Investor Base and the Stability of Portfolio Flows to Emerging Markets[1]

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December 2015

Abstract

An analysis of mutual-fund-level flow data into EM bond and equity markets confirms that different types of funds behave differently. Bond funds are more sensitive to global factors and engage more in return chasing than equity funds. Flows from retail, open-end, and offshore funds are more volatile. Global funds are more stable in their EM investments than "dedicated" EM funds. Differences in the stability of flows from ultimate investors play a key role in explaining these patterns. The changing mix of global investors over the past 15 year has probably made portfolio flows to EMs more sensitive to global financial conditions.

JEL Classification Numbers: F32; G15; G23

Keywords: Capital flows; emerging markets; mutual funds

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[1] A summary of an earlier version of this analysis was reported in IMF (2014). We are grateful for helpful discussions with IMF colleagues, and for detailed comments by Miguel Savastano. We also wish to thank participants at both the 2014 Leipzig Conference on Exchange Rates, Monetary Policy and Financial Stability in Emerging Markets and Developing Countries and the 2015 INFINITI Conference, and in particular our discussant at the latter event, Christian Friedrich. The views expressed in this Working Paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.

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I. INTRODUCTION

The events in emerging markets (EMs), following the "tapering" talk around mid 2013, and subsequent market jitters, served as a reminder that capital flows to and asset prices in EMs are still subject to substantial volatility. For many, this came as a surprise, given that compared to the 1990s, EM financial assets have matured and are now considered an established asset class. Indeed, the landscape of portfolio investment in EM economies has evolved considerably since the late 1990s in terms of investment opportunities and the global investor base.

EM financial markets have become deeper and more interconnected. In the 1990s, EM investment largely meant equity investing through dedicated EM funds (Bekaert and Harvey, 2013). This has changed substantially in the 2000s, and the role of bond flows has grown strongly. The development of local-currency bond markets has meant that many foreign investors participate directly in local markets. Concomitantly, several EMs have overcome the "original sin" problem—the inability for EMs to borrow from foreigners in their own currencies.

The mix of global portfolio investors has also changed. More money around the globe is intermediated by mutual funds, reaching about USD 30 trillion in 2013 (Investment Company Institute, ICI, 2014). Unlike other types of investors, such as pension funds and insurance companies, many of these funds are open ended. End investors can easily and quickly redeem their investments, forcing funds to sell underlying assets.[2] Moreover, since the late 2000s, a rising share of EM investment is channeled through exchange traded funds (ETFs).[3] The importance of so-called crossover investors (whose portfolio includes both developed market (DMs) and EM assets) has also risen considerably. Insurance companies and pension funds (with about USD 50 trillion assets globally, IMF, 2014a) remain important EM investors, though their relative size has declined somewhat compared to the faster-growing mutual fund industry (IMF, 2011). More recently, many sovereign wealth funds have expanded their portfolio to include EM assets.

Different types of mutual funds, pension funds, and insurance companies are likely to behave differently owing to distinctive mandates, constraints, EM expertise, and incentives. For instance, dedicated EM funds are constrained to invest only in EMs and are more likely to have better EM expertise than crossover funds. Institutional investors—defined in this paper as

[2] See Chan-Lau and Ong (2005) for details. In contrast, a closed-end fund issues a fixed number of shares, which can be traded on secondary markets. Purchase/sales pressures on fund shares are reflected in the funds' share price without inducing the purchase/sale of underlying assets.

[3] See Financial Times (2014b). Similarly to closed-end funds, ETF shares can be traded in secondary market and end investors do not redeem their investment directly from ETFs. However, unlike in the case of closed-end funds, an existing ETF can issue/withdraw shares in large blocks vis-à-vis authorized participants (APs), who are typically large broker-dealers, and they exchange ETF shares for a basket of ETF portfolio assets. Therefore, large ETF share sales pressures by end investors could lead to sales pressures of underlying assets, though cushioned by APs' trading.

including among others pension funds, insurance companies, and sovereign wealth funds (but excluding mutual funds or ETFs)—usually are not subject to potential rapid redemptions from their clients.[4] However, institutional investors are often required to invest in assets with investment-grade ratings and pursue buy-and-hold strategies. In fact, there is anecdotal evidence that different investors behaved differently during the EM sell-off episode in 2013 and early 2014.[5]

Against this backdrop, this paper tries to assess the effects that these changes in the composition of mutual fund investors imply for the volatility of capital flow to EMs. We do this by systematically investigating the behavior of different types of mutual funds active in these markets.[6] To this end, we first establish how different types of mutual funds react to global financial shocks. Next, we attempt to identify the types of funds that are more likely to engage in return chasing, a behavior that can be destabilizing. Finally, we look into some of the drivers of the differences. In particular, we investigate the role of flows from end investors, and contrast it with the role of portfolio managers.

Our approach sheds new light on key aspects of capital flows to EMs. Most of the existing literature focuses on total capital flows and their aggregated sub components. Although that type of analysis is useful to identify macroeconomic push- and pull factors, it does not allow to assess the impact of structural changes in the investor composition. Our study is one of the few papers that examine the behavior of investors in emerging markets at the micro level.[7] For this effect, the study uses monthly data on roughly 1,100 equity funds, from February 1996 to September 2013, and 200 bond funds, from November 2003 to September 2013.

Five key findings stand out. First, bond funds are substantially more sensitive to global financial shocks and engage more strongly in momentum trading (that is, they are more sensitive to past returns) than equity funds. Second, the relatively newer local-currency bond funds do not behave very differently from foreign-currency bond funds. Third, flows from retail-oriented funds, open-end funds and, contrary to conventional wisdom, dedicated EM funds are more sensitive to global financial shocks. The sensitivity of portfolio flows also differs by fund size, domicile, and style. Fourth, momentum trading is more prevalent among funds that also show a high sensitivity

[4] Kaminsky, Lyons, and Schmukler (2004), for instance, emphasize that the volatility of open-end mutual fund investment in EMs is significantly driven by ultimate investors rather than by the decisions of fund asset managers.

[5] See, for example, Financial Times (2014a).

[6] In this paper, we focus on behavior across different types of mutual funds. Our work in IMF (2014) complements this paper and analyzes the difference between mutual fund investment and institutional investment, using proprietary data of a custodian bank (Bank of New York Mellon) covering a broad range of institutional investors.

[7] Hau and Lai (2012) show that fire sales by open-end funds played an important role in the transmission of the global financial crisis from financial stocks to non-financial stocks. See also Raddatz, Schmukler, and Williams (2014), Gelos (2011), and Broner, Gelos, and Reinhart (2006).

to global financial conditions. Finally, differences in volatility of flows from end investors play a key role in explaining these patterns.[8]

Overall, these results suggest that the rising share of bond flows in recent years may have made total portfolio flows to EMs more sensitive to global financial conditions, and more procyclical.

The rest of this paper is organized as follows. Section II describes the data and overviews fund flows by their types. Section III describes the regression specifications and presents the results. Section IV concludes.

II. OVERVIEW OF PORTFOLIO FLOWS FROM MUTUAL FUNDS

A. Data Description

Our mutual fund data source is EPFR Global, with a coverage of US$22 trillion in total assets as of the end of 2013.[9] The database covers a very large fraction of U.S. and European investment funds, among others, and provides their basic characteristics such as investment styles, domiciles, benchmarks, and geographic focus.[10] We use EPFR Global's monthly data with information at the fund level, including on assets under management (AUM), inflows and outflows (redemptions), and asset allocation by country. Based on this, we estimate the flow from each fund to each country, adjusting for valuation effects.

The data cover a broad range of EMs and a relatively long time horizon. Our sample includes current and former EMs since many countries currently considered advanced economies were classified as EMs earlier in our sample period (Table 1).[11] The data contain around 74,000 fund-country-month observations from November 2003 to September 2013 for bond funds and around 470,000 observations from February 1996 to September 2013 for equity funds.[12] Tables 2 and 3 show the distribution of the data by fund type and domicile.

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[8] This is particularly important to understand why crossover funds are less sensitive to global financial conditions than EM-dedicated funds: crossover investors face less volatile flows from their ultimate investors, making their capital flows more stable.

[9] See Appendix for more details on the data and our procedures to obtain country flows from each fund, adjusting for valuation effects.

[10] See the Appendix for definition of mutual fund characteristics.

[11] In addition, some advanced economies in IMF classification, mostly based on income levels, continued to be classified as EMs in major asset indices. We exclude from the sample observations for offshore market economies, economies that are extremely dependent on oil production, euro area countries often classified as EMs (e.g., Estonia), and economies without sufficient data.

[12] The actual number of observations in our regression analysis changes in part due to the availability of explanatory variables.

Table 1. Numbers of Observations by Investment Destination Economy

	Bond Funds			Equity Funds		
Country	Number of Funds	Average Months by Fund	Number of Observations	Number of Funds	Average Months by Fund	Number of Observations
Argentina	96	39	3,737	327	36	11,739
Brazil	147	37	5,450	544	49	26,525
Bulgaria	46	24	1,109	24	16	392
Chile	84	25	2,130	395	40	15,730
China	103	20	2,096	726	47	34,102
Colombia	128	36	4,567	247	28	6,911
Croatia	63	18	1,135	98	22	2,196
Czech	3	27	81	330	40	13,230
Egypt	58	19	1,089	266	33	8,862
Hungary	107	23	2,463	340	49	16,746
India	78	11	850	627	46	28,831
Indonesia	144	33	4,701	576	46	26,575
Israel	-	-	-	374	34	12,791
Latvia	28	7	209	10	17	172
Lithuania	50	24	1,217	6	27	160
Malaysia	140	26	3,708	533	48	25,842
Mexico	163	35	5,752	487	48	23,377
Nigeria	49	20	998	58	21	1,229
Pakistan	42	19	813	90	33	2,932
Peru	130	34	4,458	293	37	10,740
Philippines	91	40	3,621	454	37	16,678
Poland	128	26	3,377	370	45	16,645
Romania	45	11	501	59	20	1,208
Russia	144	34	4,889	544	45	24,514
Serbia	56	17	939	3	10	29
South Africa	136	27	3,634	479	40	18,944
Sout Korea	-	-	-	674	53	35,657
Sri Lanka	51	20	1,003	60	42	2,547
Taiwan, P.C.	-	-	-	634	53	33,763
Thailand	60	17	1,032	572	49	28,061
Turkey	133	33	4,413	417	46	19,280
Ukraine	83	34	2,804	107	15	1,649
Vietnam	39	25	960	31	24	730
Sample Period	November 2003 - September 2013			February 1996 - September 2013		

Note: The table shows the number of funds, the average number of months with data per fund, and the total number of observations (number of funds × average number of months), country by country. The sample period is February 1996—September 2013 for equity funds, and November 2003—September 2013 for bond funds, but actual coverages vary by fund.

Table 2. Numbers of Observations by Fund Characteristics

	Bond	Equity
By end investors		
Institutional only	14,513	89,081
Retail included	54,038	314,364
Unkown	5,185	65,342
By structure in redemption restrictions		
Open-end	67,567	447,172
Close-end	6,169	21,615
By other structure		
Active, non-ETF	70,349	448,249
Active, ETF	214	16
Passive, non-ETF	-	3,523
Passive, ETF	3,173	16,999
By domicile		
US	21,194	134,633
Offshore	41,262	200,463
UK	3,948	81,677
Other Europe	6,229	31,394
Others	1,103	20,620
By geographic focus		
Global	7,298	55,239
Global EM	60,396	237,878
EM regional	6,042	159,309
AE regional	-	16,361
By currency focus		
Hard currency	45,058	-
Local currency	11,346	-
Blend currency	9,974	-
Unassigned	490	431,117
Other focus	6,868	37,670
Total	73,736	468,787
Sample period	Nov. 2003 - Sep. 2013	Feb. 1996 - Sep. 2013

Note: The table shows the number of observations (number of funds × average number of months × number of EMs) by type of fund. The sample period is February 1996—September 2013 for equity funds, and November 2003—September 2013 for bond funds, but actual coverages vary by fund and EM. See the Appendix for a definition of mutual fund characteristics.

Table 3. Numbers of Observations by Fund Domicile

	Bond	Equity
Australia	-	3,451
Austria	188	2,897
BVI	-	2,350
Bahamas	464	-
Bahrain	-	93
Belgium	-	3,122
Bermuda	-	2,566
Canada	1,007	16,754
Cayman	1,123	3,511
Denmark	5,786	5,433
Estonia	-	455
Finland	-	1,225
France	-	11,673
Germany	255	2,722
Guernsey	3,309	10,584
Hong Kong	-	297
Ireland	6,538	35,428
Japan	96	394
Jersey	-	1,667
Lux	29,482	133,349
Mauritius	-	294
NAntilles	-	46
Netherlands	-	1,306
Norway	-	1,884
Singapore	346	1,137
Sweden	-	677
Switzerland	-	9,141
USA	21,194	134,633
Unassigned	-	19
United Arab Emirates	-	2
United Kingdom	3,948	81,677
Offshore	41,262	200,463
Other Europe	6,229	31,394
Other domicles	1,103	20,620
Total	73,736	468,787
Sample period	Nov. 2003 - Sep. 2013	Feb. 1996 - Sep. 2013

Note: Number of fund-month observations (number of funds × average number of months × number of EMs) by domicile of fund. The shadows correspond to offshore market economies. “Other Europe” does not include the United Kingdom and economies categorized in the offshore market economies. “Other domiciles” includes Australia, Canada, Japan, and the United Arab Emirates. The sample period is February 1996—September 2013 for equity funds, and November 2003—September 2013 for bond funds, but actual coverages vary by fund and EM.

B. Stylized Facts: Changes of Emerging Markets Portfolio Flow Structures

Since the early 2000s, bond flows have grown faster than equity flows. Between 2003 and 2013, on average, annual bond flows to EMs amounted to 12.5 percent of AUM of mutual funds included in the sample, compared to 5.1 percent for equity flows (Figure 1).

The relative importance of various types of mutual funds and their end investors also has changed. Figure 2 shows that portfolio flows to EMs are increasingly intermediated through open-end funds, passive ETFs, crossover funds, and local-currency bond funds. In particular:

- The role of closed-end funds relative to that of open-end funds has declined. The growth of (open-end) ETFs, which often are more fee- and tax effective than mutual funds for end investors, is partly behind this trend.

- The relative importance of passively managed funds (index funds, which track indices) has grown. This again is closely related to the rapid growth of the ETF segment since most of the ETFs are currently managed passively.[13]

- The role of global funds (crossover funds) that invest both in EMs and DMs has grown relative to dedicated EM regional funds. Moreover, among dedicated EM funds, global EM funds (which invest in EMs around the world) have grown more rapidly than regional EM funds.

- Local-currency bond funds have expanded more rapidly than hard-currency bond funds. This is partly the result of efforts by several EMs to overcome the "original sin" problem.

- Mutual funds have been sold mainly to retail investors, but institutional investors have been purchasing an increasing number of mutual fund shares. Some of this reflects the expansion of defined contribution plans: in the United States, the percentage of defined contribution plans' assets in mutual funds has risen from 20 percent in 1993 to 60 percent in 2013 (ICI, 2014).[14]

- Since 2009, flows to EMs from U.S. domiciled funds have grown relative to those from offshore funds.

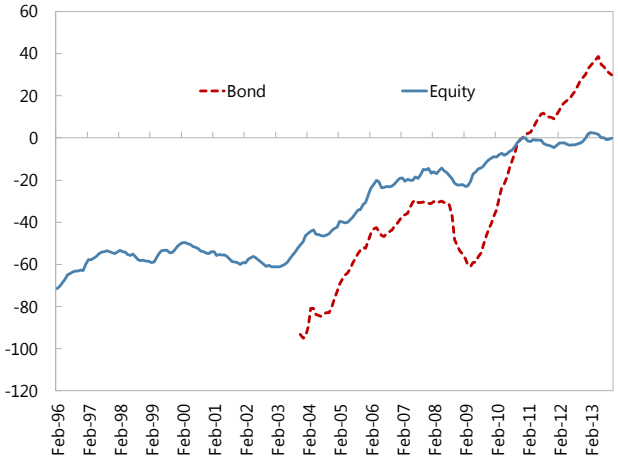
[13] U.S. Securities and Exchange Commission allowed actively managed ETFs for the first time in 2008 (see www.sec.gov/answers/etf).

[14] This does not necessarily mean that there are more institutional investors active in the EM asset class as a whole. As IMF (2011, 2014) observes, the size of the pension and insurance sectors has declined relative to mutual funds over the past two decades. J.P. Morgan (2013) estimates that out of the EM fixed income securities held by global investors, about 40 percent is held by global mutual funds, and about 60 percent is held by global institutional investors. There are some indications that the share of mutual funds among global portfolio inflows to EM fixed income securities has increased over the past 10 years or so.

Figures 1–2 also show that not all types of fund flows are equally sensitive to global financial shocks. For one, bond flows have been more volatile than equity flows. For instance, bond outflows during the first six months after September 2008 (the collapse of Lehmann Brothers) were 25.5 percent of total AUM, while equity outflows were only 5.1 percent. This pattern was repeated in other episodes, including the one around mid-2013, when the Federal Reserve hinted at the possibility of tapering its asset purchases. In addition, active funds (excluding ETFs), open-end funds, EM regional funds, U.S. domiciled funds, and local currency bond funds seem to be more sensitive to changes in global financial conditions, while passive ETFs, closed-end funds, global or global EM funds, offshore funds, and hard currency bond funds are less sensitive to these changes.

Finally, during some distress episodes, equity flows from institutional investors were more resilient than those from retail investors.[15] This is also true for bond funds during most crisis episodes, except for the global financial crisis. These observations are in line with the notion that institutional investors do not change their investment strategies frequently and are therefore less sensitive to short-term market fluctuations.

Figure 1. Cumulative Bond and Equity Flows to Emerging Markets
(1996–2013)



Sources: EPFR Global and authors' calculations.

Note: The lines in the figure represent the log differences of the gross cumulative flows of bond and equity funds to all EPFR-defined emerging markets economies between period *t* and end 2010, multiplied by 100. EPFR estimates these aggregate flows by taking the product of sample funds' country allocation weights and end investors' flows to funds. Cumulative flows are calculated by chaining the flow-to-assets under management ratio in order to adjust the effects from the expansion of the database to cover more funds over time. For the same reason, we use cumulative flows rather than assets under management to see the change of the relative size of various mutual fund segments.

[15] These episodes include the Asian crisis in 1997, the Russian crisis in 1998, the global financial crisis starting in 2007, the European debt crisis in 2011, and the tapering episode in 2013.

Figure 2. Cumulative Portfolio Flows to Emerging Markets by Fund Type: End Investors
(1996–2013)

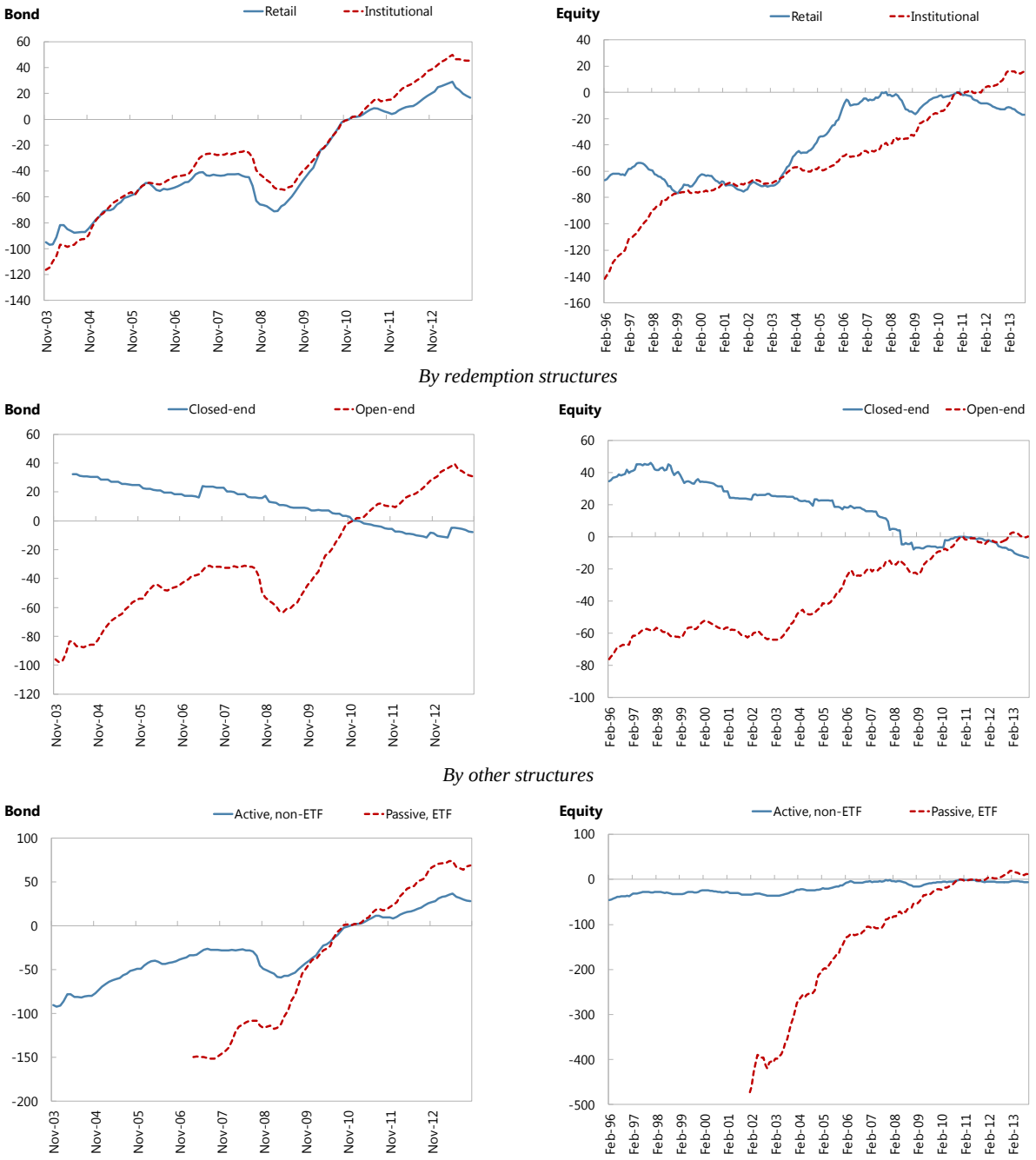
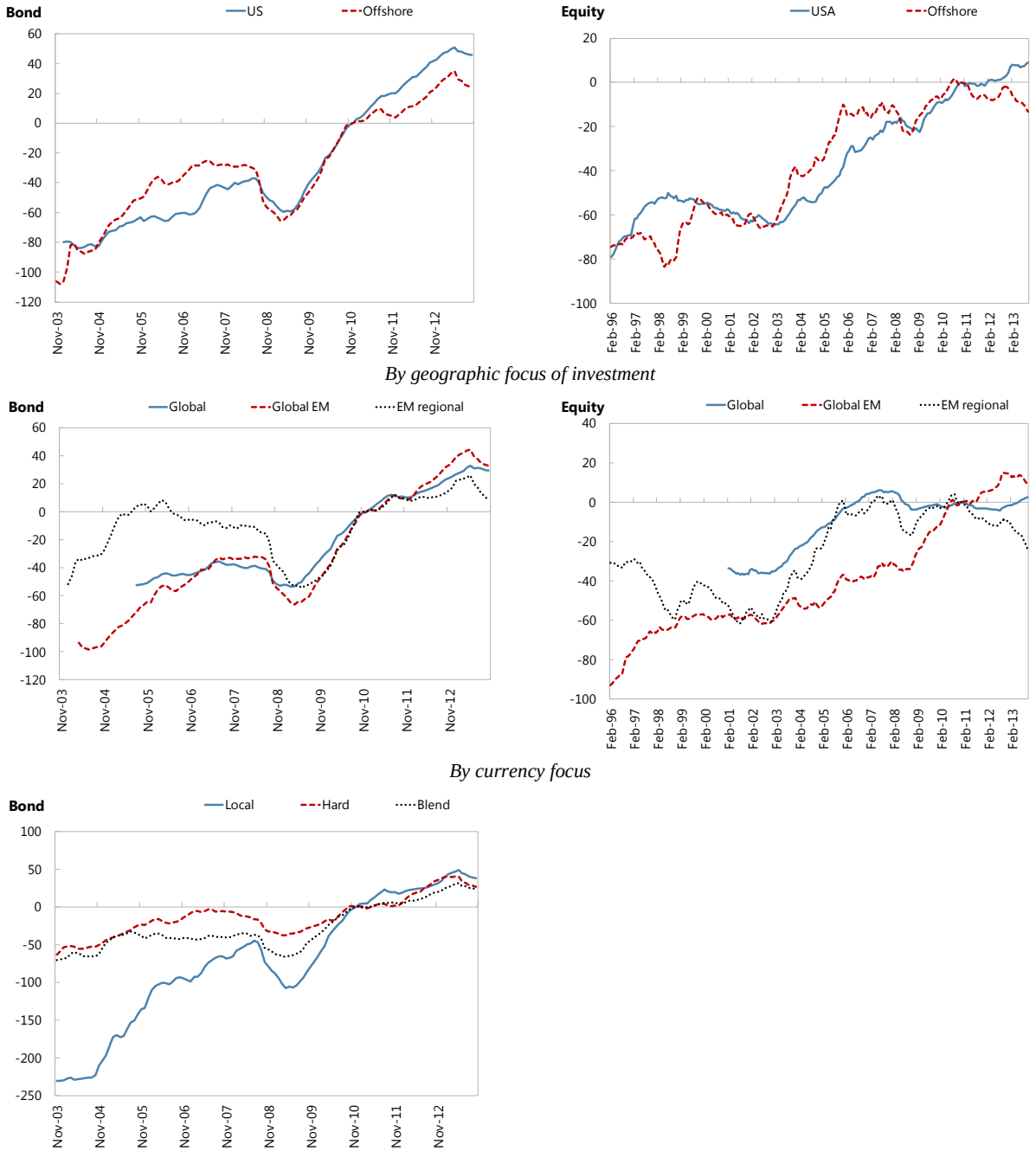


Figure 3. Cumulative Flows by Fund Type: Domicile (Cont.)

(1996–2013)



Sources: EPFR Global and authors' calculations.

Note: The lines in the figure represent the log differences of the gross cumulative flows of bond and equity funds to all EPFR-defined emerging markets economies between period *t* and end 2010, multiplied by 100. EPFR estimates these aggregate flows by taking the product of sample funds' country allocation weights and end investors' flows to funds. Cumulative flows are calculated by chaining the flow-to-assets under management ratio in order to adjust the effects from the expansion of the database to cover more funds over time. For the same reason, we use cumulative flows rather than assets under management to see the change of the relative size of various mutual fund segments. In our database, there are only a few actively managed exchange traded funds and most of the passively managed funds are exchange traded funds, therefore, we bundle passively managed funds and exchange traded funds together in the figure.

III. REGRESSIONS AND RESULTS

In this section, we examine more systematically the sensitivity of country flows to global financial conditions and past returns, by estimating fund-level panel regressions. Since the literature suggests that bond and equity flows behave differently, we run separate regressions for bond and equity funds.[16] In a second step, we focus on differences in sensitivities to global shocks across different types of bond- and equity funds.

A. Behavior of Bond and Equity Funds

What, if any, are the differences in the drivers of flows between bond and equity funds? We explore this question by estimating the following model with monthly data:

$$Flow_{i,j,t} = \alpha_{i,j} + \beta_1 \cdot Global_t + \beta_2 \cdot Return_{i,j,t-1} + \beta_3 \cdot ICRG_{j,t} + \beta_4 \cdot RID_{j,t-1} + \varepsilon_{i,j,t}\,, \quad (1)$$

where $Flow_{i,j,t}$ is the ratio of the capital flow from fund *i* to country *j* to the AUM of fund *i* (see Appendix). The first explanatory variable, $Global_t$, is a factor representing global financial conditions. The expected sign of the coefficient β_1 is negative because an increase in a global factor (a deterioration of global financial conditions) is likely to result in more capital outflows. $Return_{i,j,t-1}$ is the lagged return of fund *j* in country *i*, and signals return chasing, which could lead to more procyclical and volatile capital flows.[17] To identify this effect more clearly, we separate the impact of the global factor from that of lagged country returns by using the residual of a regression of the latter on the global factor. $ICRG_{j,t}$ is the first difference of the ICRG (International Credit Risk Guide) composite country risk rating and is a proxy for changes in local macroeconomic conditions.[18] Finally, $RID_{j,t-1}$ is the real interest rate differential relative to the 1-month U.S. Eurodollar deposit rate and tries to capture search-for-yield by global investors. The model also includes country-fund fixed effects $\alpha_{i,j}$. A detailed description of the variables is provided in the Appendix.

We estimate the model using several global factors. We first use the VIX (Chicago Board Options Exchange Market Volatility Index), the implied volatility index for the S&P 500.

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[16] See Forbes et al. (2012), Fratzscher (2012), Raddatz and Schmukler (2012), and Puy (2013).

[17] Typically, return chasing consists of buying past winners and selling past losers and is an apt description of the behavior of end investors when selecting mutual funds (see, for instance, Zheng, 1999, Bollen and Busse, 2005, and Frazzini and Lamont, 2008). We extend this concept to capital flows from mutual funds to EM asset returns. Return chasing of capital flows from mutual funds could stem from both fund managers' asset allocation decisions and end investor's behavior to chase funds' returns. In this vein, Edelen and Warner (2001) show that aggregate mutual fund flows follow market returns in the U.S. equity markets; they also find that high mutual fund investment flows into securities affect their prices and returns, possibly indicating positive feedback effects between flows and asset prices.

[18] Although unlikely, it is possible that mutual fund flows affect a country's risk standing. In order to dispel endogeneity concerns, we alternatively estimated (1) using lagged ratings. Our results are robust.

Although commonly used (see Forbes et al. 2012, Bruno and Shin, 2012, and Forbes and Warnock, 2012), the VIX is an imperfect measure of global risk. For instance, the VIX remained at a historically low level following the "tapering hint" of U.S. Fed in early 2013. Given these shortcomings, as a robustness check, we use three other variables to capture different dimensions of global risk: the TED spread, a measure of market liquidity; the Merrill Option Volatility Expectations Index (MOVE), which captures uncertainty about future U.S. Treasury rates; and the volatility of Eurodollar futures as a proxy for near-term uncertainty about U.S. monetary policy (see also IMF 2014b). These global factors are positively correlated, but the correlations are not all very large, and are not constant over time (Figure 4 and Table 4).

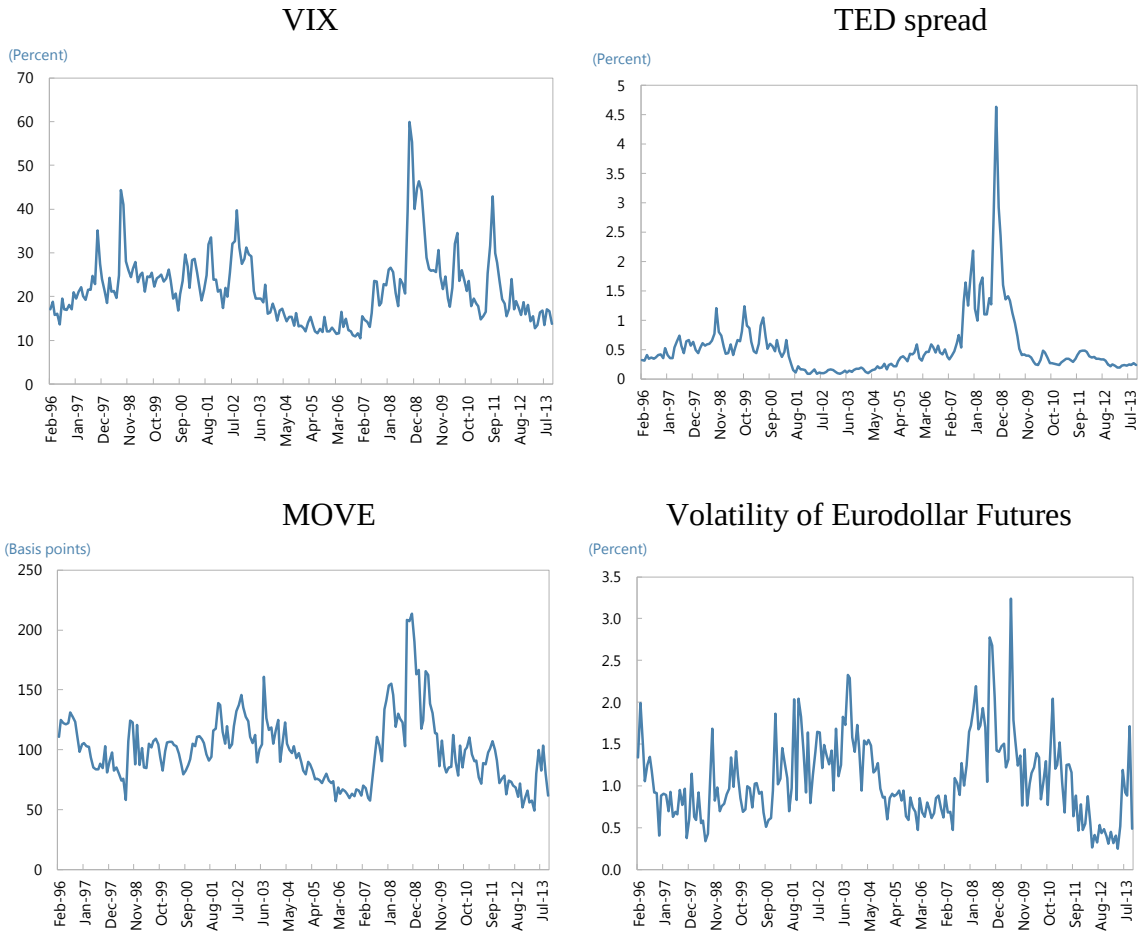
The results from the baseline estimation shown in Table 5 suggest that bond funds are much more sensitive to global financial shocks and engage in "return chasing" more strongly than equity funds. The coefficients on the VIX and the index return are statistically significant in all regressions. However, the estimated coefficients of the regressions for bond funds are much larger than those in the regression for equity funds (in absolute value), and the difference is statistically significant. This result is robust when a common sample is used for the regressions of equity and bond funds. The results are also robust to the use of alternative global factors (Table 6). In addition, although not reported here, very similar results are obtained when adding a measure of financial openness (Chinn and Ito 2006, Lane and Milesi-Ferretti 2007). In line with our estimation results, the bond flows from mutual funds dropped more strongly than equity flows during the market turbulence episode triggered by the uncertainty about U.S. monetary policy in mid-2013 (Figure 1).

The estimated coefficients are economically significant. For instance, the estimates imply that an increase in the VIX similar to that of the last four months of 2008—roughly 50 percent—leads monthly bond flows to drop by 7.5 percent of AUM. This compares to average monthly bond flows of one percent of AUM, between 2003 and 2013.

Given that the share of bond funds is rising, the estimation results imply that portfolio flows to EMs are likely to become more sensitive to global financial shocks. This result has considerable implications for capital flows as a whole for the following reasons. First, portfolio flows, as well as banking flows, are more volatile than foreign direct investment and have played important roles in the volatility of total capital flows. Second, the share of portfolio flows has risen while that of banking flows has declined in recent years, partly because the deleveraging at European banks. In fact, the surge of capital flows to EMs since the global financial crisis has largely been led by portfolio bond flows.[19]

[19] See IMF (2014a) for more detail.

Figure 4. Global Factors
(1996–2013)



Sources: Thomson Reuters Datastream and Federal Reserve Board.
Note: VIX is the Chicago Board Options Exchange Market Volatility Index. TED spread is the three-month Eurodollar deposit rate minus the three-month U.S. Treasury bill rate. MOVE is the Merrill Option Volatility Expectations Index.

Table 4. Correlation Coefficients across Global Factors
(1996–2013)

	VIX	TED	MOVE	Eurodollar
VIX	1.00	0.53	0.67	0.36
TED	0.53	1.00	0.53	0.33
MOVE	0.67	0.53	1.00	0.77
Eurodollar	0.36	0.33	0.77	1.00

Note: The correlation coefficients are computed using monthly observations from February 1996 to September 2013. VIX is the Chicago Board Options Exchange Market Volatility Index. TED is the three-month Eurodollar deposit rate minus the three-month U.S. Treasury bill rate. MOVE is the Merrill Option Volatility Expectations Index.

Table 5. Base Estimation Results: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds

(VIX as a Global Factor)

	Bond	Equity	
	Full	Full	Common
VIX	-0.150***	-0.048***	-0.052***
	(0.000)	(0.000)	(0.001)
Return	0.037***	0.008***	0.008***
	(0.004)	(0.000)	(0.000)
ICRG	0.515***	0.248***	0.288***
	(0.002)	(0.002)	(0.003)
RID	-0.015	0.007	0.014
	(0.790)	(0.649)	(0.747)
Observations	73,089	453,420	280,038
R-squared	0.040	0.032	0.039

Note: "Full" corresponds to the regressions using all available observations (November 2003-September 2013 for bond funds and March 1996-September 2013 for equity funds). "Common" corresponds to the regression for equity funds using the common coverage of countries and observation period with bond funds. The p-values reported in brackets are calculated using Driscoll and Kraay's (1998) robust standard errors. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. VIX is the Chicago Board Options Exchange Market Volatility Index. Return is the country index return. ICRG is the first difference of the ICRG (International Credit Risk Guide) composite country risk rating. RID is the real interest rate differential relative to the 1-month U.S. Eurodollar deposit rate. See the Appendix for more detail.

Table 6. Robustness Test: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor

(Alternative Global Factors)

	TED spread		MOVE		Volatility of Futures	
	Bond	Equity	Bond	Equity	Bond	Equity
Global	-2.298***	-0.673***	-0.042***	-0.003	-1.549**	0.032
	(0.000)	(0.000)	(0.000)	(0.527)	(0.011)	(0.909)
Return	0.032**	0.008***	0.034***	0.009***	0.038***	0.009***
	(0.018)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
ICRG	0.518***	0.241***	0.534***	0.254***	0.621***	0.252***
	(0.002)	(0.003)	(0.001)	(0.002)	(0.000)	(0.002)
RID	-0.087*	0.003	-0.029	0.005	-0.068	0.006
	(0.088)	(0.809)	(0.605)	(0.701)	(0.214)	(0.693)
Observations	73,089	453,420	73,089	453,420	73,089	453,420
R-squared	0.039	0.032	0.040	0.032	0.038	0.032

Note: The p-values reported in brackets are calculated using Driscoll and Kraay's (1998) robust standard errors. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Global is the global factor. TED spread is the three-month Eurodollar deposit rate minus the three-month U.S. Treasury bill rate. MOVE is the Merrill Option Volatility Expectations Index. Return is the country index return. ICRG (International Credit Risk Guide) is the first difference of the ICRG composite country risk rating. RID is the real interest rate differential relative to the 1-month U.S. Eurodollar deposit rate. See the Appendix for more detail.

B. Portfolio Flows and Other Fund Characteristics

Next, we investigate whether different types of funds respond differently to changes in global factors by estimating a regression similar to (1), augmented by one fund characteristic at a time:

$$Flow_{i,j,t} = \alpha_{i,j} + \beta_1 \cdot Global_t + \beta_2 \cdot Chara_{i,t-1} \cdot Global_t + \beta_3 \cdot Chara_{i,t-1} + \beta_4 \cdot Return_{i,j,t-1} + \beta_5 \cdot ICRG_{j,t} + \beta_6 \cdot RID_{j,t-1} + \varepsilon_{i,j,t} \quad , \tag{2}$$

where $Chara_{i,t-1}$ is a dummy variable that takes the value of one when fund *i* has a certain characteristic of interest and zero otherwise. We use the interaction term of $Chara_{i,t-1}$ and $Global_t$ to examine the different sensitivities of portfolio flows to the global factor across types of funds. If a certain type of fund has a higher sensitivity to global financial conditions

than all other types of funds (reference group), we would expect the coefficient β_2 to be negative.[20]

A potential drawback of specification (2) is that it does not account for potentially correlated fund characteristics. For instance, crossover funds tend to be larger than other funds and this characteristic could merely reflect a size effect. Therefore, we also estimate a model including multiple fund characteristic dummies simultaneously as follows:

$$Flow_{i,j,t} = \alpha_{i,j} + \beta_1 \cdot Global_t + \sum_k \beta_{2,k} \cdot Chara_{k,i,t-1} \cdot Global_t + \sum_k \beta_{3,k} \cdot Chara_{k,i,t-1} + \beta_4 \cdot Return_{i,j,t-1} + \beta_5 \cdot ICRG_{j,t} + \beta_6 \cdot RID_{j,t-1} + \varepsilon_{i,j,t} \quad . \qquad (3)$$

where $Chara_{k,i,t-1}$ is a dummy variable that takes one when fund *i* is of type *k*, and zero otherwise. For equity funds in model (3), the reference group consists of funds that are medium sized, sold to retail investors, open-end, actively managed, not ETFs, domiciled in the United States, and with a global EM focus. For bond funds in model (3), the reference group is further restricted to hard-currency bond funds. However, the geographic-focus and currency-focus dummies are highly correlated, causing a multicollinearity problem.[21] Thus, we estimate two variations of the model (3) with multiple fund characteristic dummies for bond funds; one without currency focus dummies, and another without geographic focus dummies.

The analysis reveals interesting differences across types of funds. Table 7 reports the estimated coefficients of the interaction term between the VIX and fund characteristics (results for models (2) and (3) are in the "Single" and "Multiple" columns, respectively). A negative sign indicates that flows from funds with certain characteristic in one type category (for instance, global funds) but otherwise with the characteristics of the reference group decline more than those from funds in the reference group when the VIX increases. Many estimated coefficients are statistically and economically significant and the results are generally robust to alternative global factors (see Appendix Tables 1, 2, and 3).[22] We can summarize the main findings as follows.

[20] Since most fund-type dummies are time-invariant (such as being an open-end fund) the main effect of being a certain type of fund (β_3) cannot be identified in fixed-effect models. We can identify the two effects separately only when the fund characteristic varies over time (such as fund size).

[21] This is because all EM regional funds and global EM funds generally report currency focus while global funds do not report currency focus (therefore, their currency focus automatically becomes "others").

[22] For instance, the result of the single characteristic regression for global bond funds suggests that the sensitivity of global funds and that of the other funds differ by 0.15, which is comparable to the absolute value of the sensitivity of bond flows reported in Table 5.

- Country flows from funds geared toward institutional investors tend to be less sensitive to changes in global risk aversion than those from retail-oriented funds. This is in line with the results reported in IMF (2014a) and consistent with institutional investors focusing on long-term performance and retail investors being more fickle.

- As expected, closed-end fund flows are less sensitive to changes in global risk factors than open-end funds, as they are not subject to redemptions by end investors. Hence, the decline of closed-end funds relative to open-end funds over the past two decades has probably increased the sensitivity of EM capital flows to global financial conditions.

- For bond funds, flows from active non-ETFs are more sensitive to global financial shocks than passive ETFs whereas for equity funds, there is no strong evidence that flows from ETFs react more to global financial shocks than other types of funds.[23] Therefore, we do not find strong support for the claim that recent rise of ETFs has increased capital flow volatility or intensified EM sell-offs during 2013 and 2014 (see Financial Times, 2014b).

- Somewhat surprisingly, global funds are more stable sources of capital flows than dedicated EM funds. This is contrary to the widely-held perception that crossover funds are a more volatile source of funding for EMs, because their fund managers can reallocate their portfolios completely away from EMs. This result holds even after controlling for fund size. It is possible that the behavior of end investors – which could differ for global and dedicated funds – is driving the result. This point is examined in Subsection D.

- Portfolio flows from local currency bond funds do not seem to be more sensitive to global financial shocks than those of hard currency bond funds. In principle, investment in newer products, such as local currency EM debt, should be more sensitive to global factors than that in more seasoned products like hard currency EM bonds. The fact that investment opportunities in local currency bond markets are still limited to relatively more mature and larger EMs is a likely explanation for this result.

- Small bond and equity fund flows are more sensitive to the VIX, in line with the notion that the presence of large investors can make smaller traders more aggressive in their selling (Corsetti and others 2004).

- Flows of funds domiciled in the United Kingdom and the United States are less sensitive to changes in global factors than offshore funds and other European funds. This may reflect the fact that the VIX, the measure of global risk used in these regressions, is more closely related to economic conditions in the United Kingdom

[23] Most non-ETFs are actively managed open-end funds, and non-ETFs constitute the majority of mutual funds.

and in the United States. In that case, EM assets may provide an important diversification benefit for British and American investors.

Table 7. Estimation Results: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds

	Bond			Equity	
	Single	Multiple	Multiple	Single	Multiple
By size					
Small	-0.078**	-0.113*	-0.105*	-0.054**	-0.031
Medium	-0.001			-0.007	
Large	0.058	-0.006	-0.005	0.046***	0.031**
By end investors					
Institutional only	0.021	0.054	0.062*	0.022**	0.005
Retail included	-0.021			-0.022**	
By structure in redemption restrictions					
Open-end	-0.181***			-0.042***	
Close-end	0.181***	0.044	0.067	0.042***	0.019
By other structure					
Active, non-ETF	-0.172***			0.011	
Active, ETF	-0.180	-0.252	-0.256		
Passive, non-ETF				-0.056	-0.102*
Passive, ETF	0.174***	0.110	0.099	0.003	-0.041
By domicile					
US	0.207***			0.030**	
Offshore	-0.176***	-0.181***	-0.184***	-0.039***	-0.022
UK	0.210***	0.209**	0.200**	0.042***	0.047***
Other Europe	-0.145***	-0.183***	-0.196***	-0.035	-0.029
Others	0.132*	-0.061	-0.059	-0.019	-0.008
By geographic focus					
Global	0.150***	0.091**		0.023	-0.012
Global EM	-0.033			0.042***	
EM regional	-0.100**	-0.003		-0.060***	-0.045***
AE regional				0.017	-0.019
By currency focus					
Hard currency	-0.054				
Local currency	-0.014		-0.031		
Blend currency	0.004		-0.068		
Unassigned	0.010				
Other focus	0.152***		0.078*		

Note: The table reports the estimated coefficients on the interactions between the VIX (the Chicago Board Options Exchange Market Volatility Index) and fund characteristic dummies. "Single" corresponds to the estimate of each regression with a single characteristic dummy, which is represented in (2). "Multiple" corresponds to the estimates of a regression with multiple characteristic dummies, which is represented in (3). The reference group for model (3) consists of medium-sized open-end funds (excluding exchange traded funds) sold to retail investors, actively managed, domiciled in the U.S., and investing in emerging markets globally (in hard currency in case of bond). This is why the rows for these characteristics in "multiple" columns are empty. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay's (1998) robust standard errors.

The main results listed above hold when we allow for differences across fund types in the reaction to variables other than the global factor (Appendix Table 4). Model (4) includes

interaction terms between one fund characteristic dummy and all the other explanatory variables.

$$\begin{aligned} Flow_{i,j,t} = {} & \alpha_{i,j} + \beta_1 \cdot Global_t + \beta_2 \cdot Chara_{i,t-1} \cdot Global_t + \beta_3 \cdot Chara_{i,t-1} \\ & + \beta_4 \cdot Return_{i,j,t-1} + \beta_5 \cdot Chara_{i,t-1} \cdot Return_{i,j,t-1} \\ & + \beta_6 \cdot ICRG_{j,t} + \beta_7 \cdot Chara_{i,t-1} \cdot ICRG_{j,t} \\ & + \beta_8 \cdot RID_{j,t-1} + \beta_9 \cdot Chara_{i,t-1} \cdot RID_{j,t-1} + \varepsilon_{i,j,t} \end{aligned} \quad . \qquad (4)$$

The results are broadly comparable to those reported in Table 7.

C. Which Types of Funds Engage in Return Chasing?

Which funds have a stronger tendency to buy past winners and sell past losers? We use model (4) to investigate this question. A positive coefficient for the interaction term between the fund characteristic dummy and the country's asset return would imply more return chasing (momentum trading) by those funds.

The results are reported in Table 8. They show that return chasing is often prevalent among funds that are relatively more sensitive to the VIX. For instance, return chasing is more prevalent among open-end funds than among closed-end funds, as well as among EM regional funds (compared to global or crossover funds). In addition, offshore funds and funds from continental Europe engage more in momentum trading than U.K. funds.

There are, however, important exceptions, especially among bond funds. For example, momentum trading seems to be more prevalent in bond funds with institutional investors' money relative to retail funds. This result does not seem fully consistent with the result reported in IMF (2014a), which shows that institutional investors do not engage in momentum trading. The difference may lie in the source data for funds; the institutional investors reported in EPFR Global's mutual fund database are not necessarily the same as those captured by the custodian data from Bank of New York Mellon (used in IMF, 2014a).[24]

[24] The data are collected by the bank in its role as a custodian for many large institutional investors domiciled in many jurisdictions throughout the world, which include pension funds, insurance companies, and some official reserve funds from various countries, among others.

Table 8. Estimation Results: The Extent of Return Chasing by Fund Type

	Bond	Equity
By size		
Small	-0.017*	0.003
Medium	0.010	0.004**
Large	-0.002	-0.006***
By end investors		
Institutional only	0.023**	0.000
Retail included	-0.023**	-0.000
By structure in redemption restrictions		
Open-end	0.039***	0.006***
Close-end	-0.039***	-0.006***
By other structure		
Active, non-ETF	-0.046**	-0.007
Active, ETF	0.235***	
Passive, non-ETF		0.002
Passive, ETF	0.035*	0.009
By domicile		
US	-0.009	-0.001
Offshore	0.013*	0.004**
UK	-0.005	-0.007***
Other Europe	-0.008	0.008***
Others	-0.034	-0.002
By geographic focus		
Global	-0.025**	-0.009***
Global EM	0.009	-0.002
EM regional	0.012	0.005***
AE regional		-0.002
By currency focus		
Hard currency	0.024***	
Local currency	0.006	
Blend currency	-0.028**	
Unassigned	-0.026**	
Other focus	-0.090	

Note: The table reports the estimated coefficients on the interactions between fund characteristic dummies and the lagged excess index return of the regression model (4). ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay's (1998) robust standard errors.

D. Roles of End Investors and Fund Managers

Existing investments, their returns, and in- and outflows from mutual fund shareholders determine the size of investible resources for any given fund. The managers of the fund determine how to allocate those resources across assets, within the fund's mandate. By looking at fund-level country flow data, we can discern the direct influence of ultimate investors and fund managers on the behavior of investment flows.

We apply the analysis of Raddatz and Schmukler (2012) to our data set. They essentially decompose the flow from each fund to each country as:

$$Flow_{i,j,t} = Flow_{i,t} + (Flow_{i,j,t} - Flow_{i,t}), \quad (5)$$

where $Flow_{i,t}$ is the flow from ultimate investors to fund *i* (expressed as a the ratio to the total AUM of the fund). The first term of the equation corresponds to the contribution of ultimate investors, while the second is the contribution of managers. If the manager always allocates flows from ultimate investors to EMs to keep portfolio weights constant, $Flow_{i,j,t} = Flow_{i,t}$ holds and the flow to each country $Flow_{i,j,t}$ can be explained only with the first term. On the other hand, if the manager changes allocation weights, the second term also plays a role. Raddatz and Schmukler (2012) calculate the share of the total variance of flows that can be attributed to each component for active, passive, equity, and bond funds. We calculate the standard deviation of the ratio of the flow from ultimate investors to the total AUM and the share of the total variance that is attributable to the flow from ultimate investors, for many varieties of funds.[25]

The results confirm that differences in the stability of flows from ultimate investors are behind the observed cross-fund heterogeneity of portfolio flows. In particular, funds that have more stable ultimate investor flows are generally less sensitive to global financial conditions and display a weaker tendency to engage in return chasing. For instance, when compared to all other funds, global bond funds are less sensitive to global factors (the estimated coefficient β_2 in (2) is positive—0.150—and highly significant; see Table 7) and past returns (the estimated coefficient β_5 in (4) is negative—-0.025—and significant; see Table 8). Global bond funds also have less volatile end-investor flows (a standard deviation of 5 percent compared to over 7 percent for global EM funds and EM regional funds), and have a smaller fraction of their variance explained by such flows (only 17.1 percent Table 9).

[25] Our calculation differs from Raddatz and Schmukler's (2012) in two technical aspects. First, they calculate the flow to each country using the share of the country's total assets represented by each fund, take the variance of each individual component at the country level, and then average it across countries. We take the variance of each component at the fund-country level and average it, as this is consistent with our fund-country-level regression analysis. Second, they divide the flow by the AUM at the start of period, while we use the average of the AUMs at the start and end of period.

Table 9. Stability of End Investor Flows—Variance Decomposition

	Standard deviation (%)		Share of variance (%)	
	Bond	Equity	Bond	Equity
By size				
Small	8.2	8.7	24.3	28.1
Medium	7.4	6.3	24.5	20.2
Large	4.9	3.5	20.2	13.0
By end investors				
Institutional only	8.1	7.0	40.8	29.5
Retail included	7.0	5.7	20.3	17.3
By structure in redemption restrictions				
Open-end	7.6	6.3	24.9	20.6
Close-end	1.3	2.8	6.4	6.0
By other structure				
Active, non-ETF	7.1	6.1	21.0	18.5
Active, ETF	8.4		65.9	
Passive, non-ETF		3.4		19.6
Passive, ETF	8.7	8.5	66.0	49.2
By domicile				
US	5.1	4.9	22.4	17.2
Offshore	8.2	7.7	25.1	24.2
UK	6.4	5.3	21.8	15.3
Other Europe	7.0	6.5	20.7	24.0
Others	5.9	4.8	19.7	14.9
By geographic focus				
Global	5.0	4.7	17.1	13.6
Global EM	7.5	6.6	24.6	21.3
EM regional	7.4	6.9	25.9	24.3
AE regional		4.6		11.5
By currency focus				
Hard currency	8.2		26.4	
Local currency	7.2		27.7	
Blend currency	5.8		15.8	
Unassigned	2.7		11.4	
Other focus	5.1		17.5	

Note: "Standard deviation" is the standard deviation of the ratio of the flow from ultimate investors to a fund to the total assets under management of the fund. "Share of variance" is the share of the total variance of the flows from funds to EMs that can be attributed to the flows from ultimate investors. The share is obtained by taking the variance of components corresponding to flows from ultimate investors and to allocation changes of fund managers at the country-fund level, averaging it across country-fund pairs, and dividing the averaged variance corresponding to flows from ultimate investors by the sum of the averaged variances (the covariance term is ignored). The standard deviations and variances are calculated only for country-fund pairs for which at least five time-series data are available. Here, small (large) funds are defined as funds that have been categorized as small (large) funds in more than a half of the available data.

IV. CONCLUSION

We have examined the behavior and determinants of mutual fund flows to emerging markets in the last two decades, against the backdrop of substantial changes in the landscape of portfolio investment in EM economies, both at the level of the global investor base and in local financial markets. To shed light on the impact of some of these structural changes, we have conducted a detailed examination of the behavior of different types of funds at the microeconomic level. In particular, we have investigated how different types of funds react to changes in global financial conditions, the extent to which they engage in return chasing, and the relative importance of end investors in driving this behavior.

We find that the "maturing" of the EM asset class seems to have made capital flows more volatile, more sensitive to global financial conditions, and more procyclical, despite much more solid macroeconomic fundamentals in EMs. In particular, bond funds, which have substantially gained in importance in the intermediation of funds to EMs, are relatively sensitive to global factors, and engage relatively more in momentum trading.

However, we do not find support for the widely held view that the growth of crossover funds, ETFs, and local currency bond funds are making EM portfolio flows more sensitive to global financial conditions. In part, the lower sensitivity of crossover funds seems to be attributable to lower fluctuations of flows from ultimate investors. Interestingly, funds also differ in their behavior depending on their domicile: those located in the United Kingdom and in the United States are *less* sensitive to changes in the VIX than funds domiciled elsewhere. These issues warrant further research.

Overall, given the observed differences in behavior across funds, from a recipient's country perspective, knowing one's investor base (including end investors) is important. Understanding and diversifying the investor base, possibly by working closely with asset managers, can help EM countries mitigate the volatility risk associated with international capital flows while reaping the benefits from financial globalization.

APPENDIX I. EPFR GLOBAL MUTUAL FUND FLOWS DATA

EPFR Global covers about 11,000 equity funds and about 4,500 bond funds, with a combined US$22 trillion in total assets as of the end of 2013. According to EPFR Global, its data track more than 95 percent of EM-focused bond and equity funds. Most of them are mutual funds and ETFs, though the database includes limited number of hedge funds. The share of U.S. investment in EMs covered by EPFR Global is around 58 percent for equities, and more than 42 percent for bonds as of the end of 2012.[26]

The database covers primarily mutual funds, and does not cover all the investment fund flows nor capital flows intermediated directly by institutional investors, and therefore it may not provide the full picture of macro level portfolio flows. However, these coverage issues are of little concern for our analysis. This is because we focus on differences across different types of mutual funds to understand aggregate dynamics. Although funds not covered by EPFR Global may tend to investors that can behave differently, it is unlikely that their inclusion would affect our results.

EPFR Global's high-frequency reporting (monthly for funds' asset allocation by country as well as daily and weekly data for selected indicators from sub-samples of funds) is also an advantage compared to quarterly or annual data. Moreover, data recording methods of EPFR Global are better suited for our purpose than the Balance of Payments (BoP) or Coordinated Portfolio Investment Survey (CPIS). EPFR Global records transactions on nationality basis, while the BoP and CPIS report on residency basis.[27] The CPIS also misclassifies some bond fund flows as equity flows (Felettigh and Monti, 2008).

A. Portfolio Flows to Each Country from Each Fund

Portfolio flows to each EM from each fund need to be calculated from asset allocation data, adjusting for their change owing to the changes of portfolio assets' value. For this, we assume that the asset returns are well approximated by country index returns, following Gelos and Wei (2005). The flow-to-AUM ratio of fund i for country j at month t is calculated as:

$$Flow_{i,j,t} = \frac{w_{i,j,t}A_{i,t} - w_{i,j,t-1}A_{i,t-1}(1+r_{j,t})}{(w_{i,j,t}A_{i,t} + w_{i,j,t-1}A_{i,t-1})/2}$$

[26] The U.S. investment is from the U.S. Treasury International Capital System. Here, EM economies are those listed in Table 1.

[27] For instance, if a corporate of an EM economy issues bonds through its London subsidiary, EPFR Global treats the bonds as the liability of an entity in the EM economy, but the BoP and CPIS treat as the liability of a U.K. entity, which is problematic to explain the behavior of the EM company. See Shin (2013) for this issue.

where $w_{i,j,t}$ is the allocation weight at the end of month t, $A_{i,t}$ is the AUM at the end of month t, and $r_{j,t}$ is the index return from t-*1* to t. The estimated flow to a country from a fund in a month is normalized by the average of the assets allocated to the country at the beginning and end of the month. As indexes, we use the MSCI for equity funds, the GBI-EM for local currency bond funds, and the EMBI Global for other bond funds. Since the GBI-EM is a local currency index, we adjust its returns using bilateral exchange rates to obtain U.S. dollars-denominated returns.[28]

B. Explanatory Variables

Global. The VIX is the implied volatility index for the S&P 500 as reported by the Chicago Board Options Exchange. The TED spread is defined as the three-month Eurodollar deposit rate minus the three-month Treasury bill rate. The MOVE is the average implied volatility across a wide range of outstanding options on U.S. Treasuries. The volatility of Eurodollar futures is the realized volatility calculated using daily changes in the Thomson Reuter's futures continuous series index of the 9th three-month futures in the corresponding month and annualized by multiplying with the square root of 250. We use the end of month data for the VIX, the TED spread, and the MOVE.

Return. The country index return is calculated as excess dollar returns of relevant indices (namely, bond index for bond flows and equity index for equity flows) over one month U.S. Eurodollar deposit rate. We use the MSCI for equity funds; the U.S. dollars-denominated GBI-EM for local currency bond funds; and the EMBI Global for other bond funds. We use one-month lagged return to mitigate the endogeneity concern. We also take three-month moving averages since it is plausible that flows respond to the past returns with a lag of several months (see, for instance, Jegadeesh and Titman, 1993). Since the individual country index return is somewhat correlated with the global factor, we use its orthogonal component relative to the VIX or the relevant global factor.

ICRG. The ICRG composite country risk rating is based on 22 variables, covering political, financial, and economic risks. A higher rating means a lower risk.

RID. The one-month-lagged real interest rate differential calculated as the difference between the local short term interest rate with a maturity of around one month and the U.S. short term interest rate minus the difference in the one-year-ahead forecasts of CPI inflation from Consensus Forecasts.

C. Definition of Mutual Fund Characteristics

We classify funds according to the following categories:

[28] We apply some basic data clean up principles and discard samples when (1) there is a large (more than 0.1 percent) internal inconsistency for AUM of a same fund at a same period in different parts of the database, possibly due to reporting mistakes; and (2) computed fund flow per AUM is greater than 100% in absolute value.

- *Fund size.* We define large and small funds as those above the 80th and below 20th percentiles of AUM in each month, respectively, labeling the remainder as medium funds.

- *End investor type.* Mutual funds have been sold mainly to retail investors, but institutional investors have been purchasing an increasing number of mutual fund shares, in part owing to the rise of defined contribution pension plans. EPFR Global provides share-class data for each fund: some shares are targeted to retail investors and the others are to institutional investors. Using these data, we identify whether a fund is sold only to institutional investors or is sold also to retail investors. Many funds do not report the types of ultimate investors for all of their shares. In such a case, we indentify a fund as a retail fund when some of its shares are known to be sold to retail investors. As a result, we limit the unidentified observations to around 7 percent of bond funds and around 14 percent of equity funds.

- *Open-end or closed-end*. Investors can flexibly add to or redeem money from open-end funds, but not with closed-end funds.

- *Investment style (active or passive) and ETF*. Passive funds usually replicate a given benchmark index. Fund managers of active funds exercise their judgment to over- or underweight certain assets compared to their benchmarks. Most ETFs are passively managed index funds while most non-ETFs ("mutual funds" in a narrow sense) are actively managed. We use four combined characteristics: active, non-ETF; active, ETF; passive, non-ETF; and passive ETF.

- *Fund domicile.* Fund domicile roughly corresponds to the residence of ultimate mutual fund shareholders, though the correspondence is not necessarily accurate, especially for funds domiciled in offshore markets. We divide domiciles into five regions: the United States; offshore market economies; the United Kingdom; other European countries; and others. Table 3 reports the numbers of observations by domicile. The table also indicates the definition of offshore market economies (see IMF, 2008).

- *Geographic focus of the fund's investment destination.* We divide funds into four groups: global funds; global EM funds; EM regional funds; and advanced economy regional funds. For instance, global funds correspond to funds that are categorized as "Global" or "Global ex-US" by EPFR Global.

- Currency focus (for bond funds only). We use five groups: hard currency; local currency; blend currency; unassigned; and other currency focus.

Table 1. Robustness Test: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds

(Ted Spread as the Global Factor)

	Bond			Equity	
	Single	Multiple	Multiple	Single	Multiple
By size					
Small	-1.234*	-2.244***	-2.195***	-0.244	0.042
Medium	-0.394			-0.142	
Large	1.508**	0.507	0.748	0.351**	0.243
By end investors					
Institutional only	0.763	1.265**	1.230**	-0.125	-0.381*
Retail included	-0.763			0.125	
By structure in redemption restrictions					
Open-end	-3.293***			0.259	
Close-end	3.293***	1.685***	1.728***	-0.259	-0.526
By other structure					
Active, non-ETF	-3.600***			-0.727	
Active, ETF	-126.420*	-135.289***	-134.144***		
Passive, non-ETF				-0.451	-0.881
Passive, ETF	3.666***	3.920**	4.128**	1.285	0.909
By domicile					
US	2.664***			0.225	
Offshore	-2.224***	-1.983**	-1.963*	-0.365	0.000
UK	2.735***	4.395***	4.513***	0.591***	0.738***
Other Europe	-2.211***	-2.044***	-1.990**	-1.247***	-1.078***
Others	2.762***	0.299	0.352	0.720	0.575
By geographic focus					
Global	2.908***	1.495**		0.526*	0.031
Global EM	-0.905**			0.610***	
EM regional	-1.512**	-1.085		-0.865***	-0.760***
AE regional				-0.285	-0.704
By currency focus					
Hard currency	-1.376***				
Local currency	-1.233*		-1.364		
Blend currency	0.817*		0.358		
Unassigned	0.838				
Other focus	2.979***		1.607**		

Note: The table reports the estimated coefficients on the interactions between the TED spread (the three-month Eurodollar deposit rate minus the three-month U.S. Treasury bill rate) and fund characteristic dummies. "Single" corresponds to the estimate of each regression with a single characteristic dummy, which is represented in (2). "Multiple" corresponds to the estimates of a regression with multiple characteristic dummies, which is represented in (3). The reference group for model (3) consists of medium-sized open-end funds (excluding exchange traded funds) sold to retail investors, actively managed, domiciled in the U.S., and investing in emerging markets globally (in hard currency in case of bond). This is why the rows for these characteristics in "multiple" columns are empty. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay's (1998) robust standard errors.

Table 2. Robustness Test: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds

(MOVE Index as the Global Factor)

	Bond			Equity	
	Single	Multiple	Multiple	Single	Multiple
By size					
Small	-0.016	-0.021	-0.018	-0.022***	-0.017**
Medium	-0.009			0.005*	
Large	0.023**	0.007	0.006	0.008**	0.001
By end investors					
Institutional only	0.014	0.032***	0.035***	0.013***	0.006
Retail included	-0.014			-0.013***	
By structure in redemption restrictions					
Open-end	-0.056***			0.002	
Close-end	0.056***	0.030*	0.036*	-0.002	-0.008
By other structure					
Active, non-ETF	0.032			-0.021*	
Active, ETF	-0.117	-0.144*	-0.146*		
Passive, non-ETF				-0.010	-0.019
Passive, ETF	-0.027	-0.053	-0.051	0.032**	0.020
By domicile					
US	0.051***			0.007*	
Offshore	-0.045***	-0.044***	-0.042***	-0.008**	-0.002
UK	0.028	0.024	0.022	0.009**	0.014***
Other Europe	-0.024*	-0.032**	-0.033**	-0.006	-0.001
Others	0.059***	0.025	0.025	-0.010	-0.004
By geographic focus					
Global	0.043***	0.019**		0.002	-0.007
Global EM	-0.017**			0.007***	
EM regional	-0.017	0.012		-0.010***	-0.009***
AE regional				0.007	-0.006
By currency focus					
Hard currency	-0.021*				
Local currency	-0.007		-0.004		
Blend currency	0.011		-0.011		
Unassigned	0.028				
Other focus	0.043***		0.018		

Note: The table reports the estimated coefficients on the interactions between the MOVE (the Merrill Option Volatility Expectations Index) and fund characteristic dummies. “Single” corresponds to the estimate of each regression with a single characteristic dummy, which is represented in (2). “Multiple” corresponds to the estimates of a regression with multiple characteristic dummies, which is represented in (3). The reference group for model (3) consists of medium-sized open-end funds (excluding exchange traded funds) sold to retail investors, actively managed, domiciled in the U.S., and investing in emerging markets globally (in hard currency in case of bond). This is why the rows for these characteristics in “multiple” columns are empty. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay’s (1998) robust standard errors.

Table 3. Robustness Test: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds

(Volatility of Eurodollar Futures as the Global Factor)

	Bond			Equity	
	Single	Multiple	Multiple	Single	Multiple
By size					
Small	-0.861	-0.881	-0.748	-1.134***	-1.046***
Medium	-0.374			0.444**	
Large	1.106*	0.380	0.215	0.220	-0.125
By end investors					
Institutional only	0.853	1.718***	1.700***	0.652***	0.258
Retail included	-0.853			-0.652***	
By structure in redemption restrictions					
Open-end	-2.433***			0.413	
Close-end	2.433***	1.416	1.362	-0.413	-0.823**
By other structure					
Active, non-ETF	0.844			-1.120	
Active, ETF	-6.228**	-7.495***	-8.356***		
Passive, non-ETF				-0.218	-0.603
Passive, ETF	-0.465	-2.271	-2.417	1.442	0.973
By domicile					
US	2.187***			0.311	
Offshore	-1.485**	-1.623**	-1.824**	-0.340	-0.045
UK	0.265	-0.453	-0.738	0.382	0.555*
Other Europe	-2.054**	-2.341**	-2.241**	-0.303	-0.164
Others	3.014***	1.584	1.435	-0.413	-0.193
By geographic focus					
Global	1.988**	0.811		0.075	-0.395
Global EM	-0.796*			0.346	
EM regional	-0.862	0.126		-0.436	-0.456
AE regional				0.102	-0.423
By currency focus					
Hard currency	-1.691**				
Local currency	1.069		1.722*		
Blend currency	0.664		-0.044		
Unassigned	2.771				
Other focus	1.984**		1.057		

Note: The table reports the estimated coefficients on the interactions between the volatility of Eurodollar futures and fund characteristic dummies. “Single” corresponds to the estimate of each regression with a single characteristic dummy, which is represented in (2). “Multiple” corresponds to the estimates of a regression with multiple characteristic dummies, which is represented in (3). The reference group for model (3) consists of medium-sized open-end funds (excluding exchange traded funds) sold to retail investors, actively managed, domiciled in the U.S., and investing in emerging markets globally (in hard currency in case of bond). This is why the rows for these characteristics in “multiple” columns are empty. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay’s (1998) robust standard errors.

Table 4. Robustness Test: Sensitivity of Bond and Equity Flows vis-à-vis the Global Factor by Type of Funds Using the VIX as the Global Factor and with Interactions with Other Factors

	Bond	Equity
By size		
Small	-0.085**	-0.054**
Medium	0.003	-0.007
Large	0.055	0.047***
By end investors		
Institutional only	0.009	0.021*
Retail included	-0.009	-0.021*
By structure in redemption restrictions		
Open-end	-0.184***	-0.041**
Close-end	0.184***	0.041**
By other structure		
Active, non-ETF	-0.154**	0.024
Active, ETF	0.705**	
Passive, non-ETF		-0.064
Passive, ETF	0.158***	-0.011
By domicile		
US	0.213***	0.028**
Offshore	-0.182***	-0.038***
UK	0.218***	0.043***
Other Europe	-0.142***	-0.034
Others	0.087	-0.016
By geographic focus		
Global	0.155***	0.025
Global EM	-0.035	0.043***
EM regional	-0.102**	-0.061***
AE regional		0.012
By currency focus		
Hard currency	-0.063*	
Local currency	-0.010	
Blend currency	0.003	
Unassigned	0.164***	
Other focus	-0.063	

Note: This table reports the estimated coefficients on the interactions between the VIX (the Chicago Board Options Exchange Market Volatility Index) and one fund characteristic dummy of the regression model (4), which includes additional interaction terms between the fund characteristic dummy and variables other than the VIX. As in model (2), only one fund characteristic dummy is included in the model at a time. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. Inference is based on Driscoll and Kraay's (1998) robust standard errors.

REFERENCES

Bekaert, Greet, and Campbell Harvey, 2013, "Emerging Equity Markets in a Globalizing World," manuscript.

Bollen, Nicolas, and Jeffrey Busse, 2004, "Short-Term Persistence in Mutual Fund Performance," *Review of Financial Studies*, Vol. 18, No. 2.

Broner, Fernando A., Gaston Gelos, and Carmen M. Reinhart, 2006. "When in Peril, Retrench: Testing the Portfolio Channel of Contagion," *Journal of International Economics*, Vol. 69, No. 1, pp. 203–30.

Chan-Lau, Jorge, and Li Lian Ong, 2005 "U.S. Mutual Fund Retail Investors in International Equity Markets: Is the Tail Wagging the Dog?" *International Economics and Finance Journal*, Vol. 1, No.1, pp. 73-88.

Chinn, Menzie D., and Hiro Ito, 2006, "What Matters for Financial Development?" *Journal of Development Economics*, Vol. 81, No.1, pp. 163–92.

Corsetti, Giancarlo, Amil Dasgupta, Stephen Morris, and Hyun S. Shin, 2004, "Does One Soros Make A Difference? A Theory of Currency Crises With Large and Small Traders," *Review of Economic Studies*, Vol. 71, No.1, pp. 87–114.

Driscoll, John C., and Aart C. Kraay, 1998, "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data," *Review of Economics and Statistics* Vol. 80, No. 4, pp. 549–560.

Edelen, Roger, and Jerold Warner, 2001, "Aggregate Price Effects of Institutional Trading: A Study of Mutual Fund Flow and Market Returns," *Journal of Financial Economics*, Vol. 59, Issue 2, pp. 195-200.

Felettigh, Alberto, and Paola Monti, 2008. "How to Interpret the CPIS Data on the Distribution of Foreign Portfolio Assets in the Presence of Sizeable Cross-border Positions in Mutual Funds. Evidence for Italy and the Main Euro-area Countries," Questioni di Economia e Finanza (Occasional Papers) 16, Bank of Italy, Economic Research and International Relations Area.

Financial Times, 2014a, "Investors Pull $12 bn from EM Stock Funds," January 31.

_____, 2014b, "EMs are Paying the Price of ETF Liquidity," February 12.

Forbes, Kristin J., Marcel Fratzscher, Thomas Kostka, and Roland Straub, 2012, "Bubble Thy Neighbor: Direct and Spillover Effects of Capital Controls," NBER Working Paper, No.18052.

_____, and Francis Warnock, 2012, "Capital Flow Waves: Surges, Stops, Flight and Retrenchment," *Journal of International Economics*, Vol. 88, No. 2, pp. 235-251.

Fratzscher, Marcel, 2012, "Capital Flows, Push Versus Pull Factors and the Global Financial Crisis," *Journal of International Economics,* Vol. 88, No. 2, pp. 341–56.

Frazzini, A, and Owen Lamont, 2008, "Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns," *Journal of Financial Economics*, Vol. 88, Issue. 2, pp. 299-322.

Gelos, Gaston, 2011, "International Mutual Funds, Capital Flow Volatility, and Contagion–A Survey," IMF Working Paper, No.11/92.

_____, and Shang-Jin Wei, 2005, "Transparency and International Portfolio Holdings," *Journal of Finance,* Vol. 60, No. 6, pp. 2987–3020.

Hau, Harald, and Sandy Lai, 2012, "The Role of Equity Funds in Financial Crisis Propagation," unpublished manuscript, University of Geneva.

International Monetary Fund (IMF), 2008, "Offshore Financial Centers: Report on the Assessment Program and Proposal for Integration with the Financial Sector Assessment Program," (Washington: International Monetary Fund).

_____, 2011, "Long-Term Investors and Their Asset Allocation: Where Are They Now?" Chapter 2 of the September 2011 *Global Financial Stability Report*, (Washington: International Monetary Fund).

_____, 2014a, "How Do Changes in the Investor base and Financial Deepening Affect Emerging Market Economies?" Chapter 2 of the April 2014 *Global Financial Stability Report,* (Washington: International Monetary Fund).

_____, 2014b, "Global Liquidity: Issues for Surveillance", Policy Paper (Washington: International Monetary Fund).

Investment Company Institute, ICI, 2014, *2014 Investment Company Fact Book*.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *Journal of Finance*, Vol. 48, No. 1, pp. 65-91.

Jotikasthira, Chotibhak, Christian Lundblad, and Tarun Ramadorai, 2012, "Asset Fire Sales and Purchases and the International Transmission of Funding Shocks," *Journal of Finance,* Vol. 67, No. 6, pp. 2015–50.

J.P. Morgan, 2013, *Where Are Emerging Markets Headed?,* November.

Lane, Philip.R., and Gian Maria Milesi-Ferretti, 2006, "The External Wealth of Nations, Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004," Journal of International Economics, Vol. 73, No.2, pp. 223–50.

Kaminsky, Graciela, Richard Lyons, and Sergio Schmukler, 2004, "Managers, Investors, and Crises: Mutual Fund Strategies in Emerging Markets," *Journal of International Economics*, Vol. 64, No.1, pp. 113–134.

Puy, Damien, 2013, "Institutional Investors Flows and the Geography of Contagion," Economics Working Papers, ECO 2013/06, European University Institute.

Raddatz, Claudio, and Sergio Schmukler, 2012, "On the International Transmission of Shocks: Micro-Evidence from Mutual Fund Portfolios," *Journal of International Economics*, Vol. 88, No. 2, pp. 357–74.

_____, Sergio Schmukler, and Tomás Williams, 2014, "International Asset Allocation and Capital Flows: The Benchmark Effect," Policy Research Working Paper 6866, World Bank.

Shin, Hyun Song, 2013, "The Second Phase of Global Liquidity and Its Impact on Emerging Economies," Remarks at Federal Reserve Bank of San Francisco Asia Economic Policy Conference.

Zheng, Lu, 1999, "Is Money Smart? A Study of Mutual Fund Investors' Fund Selection Ability," *The Journal of Finance*, Vol. 54, Issue 3, pp. 901-933.