CHAPTER 2

HOW DO CHANGES IN THE INVESTOR BASE AND FINANCIAL DEEPENING AFFECT EMERGING MARKET ECONOMIES?

Summary

The landscape of portfolio investment in emerging markets has evolved considerably over the past 15 years. Their financial markets have deepened and have become more globalized. New asset class segments have developed, including local currency sovereign debt, with increased direct participation of global investors. The mix of global investors has also changed. The role of bond funds—especially local currency bond funds, open-end funds with easy redemption options, and funds investing only opportunistically in emerging markets—has risen.

This chapter aims to identify the effects of these changes on the stability of portfolio flows and asset prices in emerging markets with a range of methods using relatively unexploited data. We examine the sensitivity of flows from various types of global investors to assess whether the new mix of investors has made portfolio flows more or less sensitive to global financial shocks. We also investigate the role of investor herding and domestic macro fundamentals during crises. Moreover, we analyze how the strength of local financial systems affects the sensitivity of local asset prices to global financial shocks.

We find that the structures of both the investor base and local financial systems matter. The new mix of global portfolio investors is likely to make overall portfolio flows more sensitive to global financial conditions. The share of more volatile bond flows has risen, and larger foreign participation in local markets can transmit new instability. Growing investment from institutional investors that are generally more stable during normal times is welcome, but these investors can pull back more strongly and persistently when facing an extreme shock. While domestic macroeconomic conditions matter, investor herding among global funds continues, and there are few signs of increasing differentiation along macroeconomic fundamentals during crises over the past 15 years. Nonetheless, the progress made by emerging markets toward strengthening their financial systems reduces their financial asset prices' sensitivity to global financial shocks.

Our results suggest options to enable emerging markets to reap the benefits of financial globalization while minimizing its potential costs. Governments can promote larger local investor bases, deeper banking sectors and capital markets, and better institutions. Initiatives to support local currency bond market development are beneficial, but the size of direct participation of foreign investors in local markets needs to be monitored and balanced with broad financial system development policies. Knowing the investor base and its characteristics is critical for assessing the risks of capital flow reversals and designing macroprudential policies.

Introduction

Financial markets in emerging market economies have deepened significantly over the past 15 years and witnessed substantial changes in their global and local investor bases. Improved fundamentals in emerging market economies and the persistently low yields in advanced economies have encouraged a broader range of investors to increase their investment in the financial assets of emerging market economies. This has helped foster the development of local financial markets and of new asset classes, such as local-currency-denominated sovereign debt. Global investors are directly entering local currency bond markets, while the local institutional investor base has also been expanding. At the same time, the relative role of cross-border bank lending has declined and, within portfolio flows, fixed-income flows have gained in importance compared with equity flows. The composition of international mutual funds investing in emerging markets has been changing, with a growing importance of globally operating funds that do not focus on emerging markets. All these investors differ in their mandates, constraints, and incentives and behave differently during volatile times (Figure 2.1).

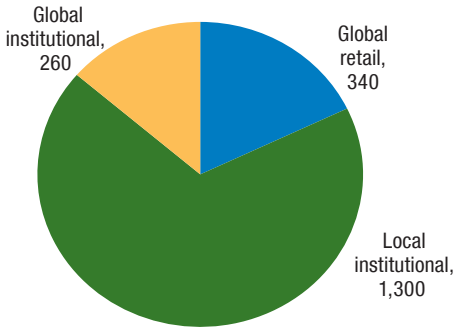
Despite potential benefits, these changes may have heightened the exposure of emerging markets to global financial conditions and to contagion and herding. Around mid-2013 and again in January 2014, for example, uncertainty over U.S. monetary policy roiled the markets for emerging market securities and generated substantial sell-offs, particularly among retail investors. This raises the question of whether the structural changes discussed above have contributed to enhance emerging markets' resilience to external financial shocks. For example, the increased foreign presence in local markets is likely to have been fundamental for the development of these markets, but may have made local asset prices more exposed to global factors. The ability of governments to issue their debt in local currency has reduced their currency mismatches, but the transfer of exchange rate risk to investors may have made portfolio flows more volatile. Similarly, the larger role of global investors in emerging market economies' bond markets may have made these flows more dependent on the ups and downs in global risk appetite.

The authors of this chapter are Hiroko Oura (team leader), Nicolás Arregui, Luis Brandao-Marques, Johannes Ehrentraud, Hibiki Ichiue, and Prachi Mishra with contributions and research assistance from Sofiya Avramova.

Figure 2.1. Investor Base for Bonds in Emerging Markets

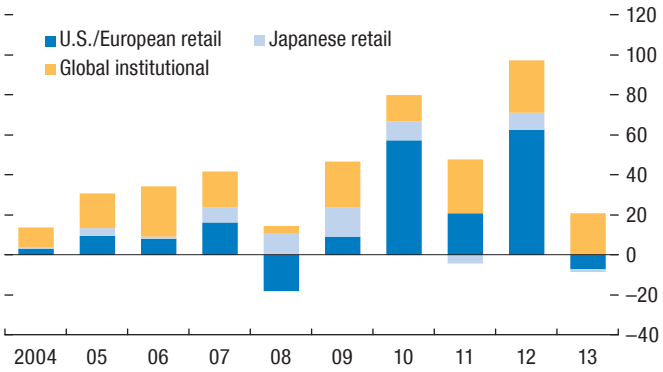
About 80 percent of bonds of emerging markets are owned by institutional investors…

1. Ownership of Emerging Market Bonds (Billions of U.S. dollars; as of 2013)



…but retail investor flows remain important and have been more volatile.

2. Bond Flows to Emerging Markets (Billions of U.S. dollars)



Source: J.P. Morgan.
Note: Global retail investors consist of European and U.S. mutual funds and Japanese investment trusts. Global institutional investors include investors with long-term strategic mandates such as pension funds, insurance companies, and official funds. Local institutional investors encompass emerging market insurance companies and pension funds. Some market participants consider the figures underestimate the assets and flows from global institutional investors.

Financial integration, especially if not managed well, can make asset prices and portfolio flows more sensitive to global "push" factors and pose challenges to financial stability in emerging markets.[1] These markets have strengthened buffers, including larger

[1]Capital flows are driven by so-called push factors reflecting common global conditions (such as monetary and fiscal policies in advanced economies, global liquidity, and global risk aversion) and country-specific "pull" factors (such as local macroeconomic fundamentals and institutional quality).

international reserves, flexible exchange rates, and reduced exchange rate mismatches at the sovereign level. However, sudden large capital outflows can still induce financial distress with their effects on exchange rates and the balance sheets of banks, firms, and households. Capital inflows driven by global financial conditions can help generate credit booms that sow the seeds of crises (Rey, 2013). Similarly, greater local asset price exposure to global conditions makes funding conditions for households, firms, and sovereigns more dependent on external financial conditions.

Against this backdrop, this chapter aims to identify the effects of changes in the global investor base and financial deepening in the recipient emerging markets on their exposure to global financial conditions. In particular, it assesses how these developments have affected the sensitivity of bond and equity flows as well as asset prices (foreign and local currency bonds, equities, and currencies) to global financial shocks. The chapter complements research that has focused on macroeconomic aspects of capital flows and macroprudential and capital flow management policies.[2]

Specifically, this chapter aims to answer the following questions:

- What do the changes in the global and local investor base of emerging markets over the past 15 years imply for the sensitivity of portfolio flows to global financial conditions? Have global investors become more discerning about local fundamentals? Has herding declined as the new asset classes have matured?
- What forms of financial deepening can reduce the sensitivity of emerging markets' asset prices to global financial shocks? Have developing local currency bond markets contributed to financial stability or have they increased exposure of local yields to global factors when combined with increased foreign participation?

Our findings indicate that the sensitivity of portfolio flows to global financial conditions is likely to increase and that herding among funds is on the rise. We investigate global flows involving institutional investors—defined as large pension and insurance funds, international reserve funds, and sovereign wealth funds—by using a unique custodian database from Bank of New York Mellon (BNY). Flows from predominantly retail-oriented mutual funds are examined with the Emerging Portfolio Fund Research (EPFR Global) database.[3]

- Fixed-income flows are substantially more sensitive to global push factors than are equity flows, and their importance in overall capital flows is growing.
- Mutual fund investor flows (Box 2.1) are generally more sensitive to global factors than those of institutional investors, and they are expanding exposures to emerging markets, making flows more sensitive to push factors (as witnessed during the recent bout of withdrawals from emerging market economies).
- These developments have been somewhat moderated by large institutional investors, which contribute to the stability of flows during normal times. However, they pulled back more strongly and persistently when faced with extreme shocks. They have also been increasing their allocations to emerging markets, but not to the extent that they become relatively larger players in these markets (Figure 2.1).
- Although country-level macroeconomic conditions in emerging markets matter for resilience, their role during crises does not seem to have grown over time since the late 1990s, and herding among global mutual funds has been increasing.

Nonetheless, the progress made by emerging markets toward financial deepening and better institutions mitigates some of the unpleasant side effects of financial globalization. Having a larger domestic investor base, deeper banking sectors and capital markets, more liquid markets, and better institutions all bring quantitatively large benefits. In particular, relying more on local currency debt makes bond prices more resilient to the ups and downs of international capital markets. Yet, while foreign participation has often played a key role in developing local markets, a large share of foreign holdings of domestic debt comes with a heightened bond price sensitivity to global financial shocks. This further underscores the importance of developing a local investor base.

[2]For instance, see IMF (2012, 2013a, 2013b, 2013c) and Ghosh and others (2009).

[3]Mutual funds are generally sold to retail investors, although a rising number of institutional investors purchase mutual fund shares. In most of the past research, the EPFR Global data were analyzed only at the aggregate level without differentiating across types of funds. Further details are given in Annex 2.1.

Box 2.1. A Primer on Mutual Funds

Mutual funds are collective investment vehicles that sell fund shares to retail and institutional investors and invest the proceeds in securities, though legal arrangements vary across countries. These collective investment vehicles are often referred to as investment funds, managed funds, or funds. This chapter uses the term mutual funds.

Types of mutual funds and their share in the industry

Funds can be classified according to various characteristics, including investment focus (such as equity or fixed income). Table 2.1.1 defines some key characteristics that are of interest in the context of financial stability, and Table 2.1.2 shows the share of each type of fund.

Behavior by fund type

Studies have found that funds show distinctive behaviors.

- *Open-end versus closed-end:* Open-end funds tend to engage more in herd behavior and withdraw from distressed economies more strongly and quickly than closed-end funds (Raddatz and Schmukler, 2012; Borensztein and Gelos, 2003a and 2003b); their behavior seems largely driven by that of individual investors (Chan-Lau and Ong, 2005). 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 nonfinancial stocks.
- *Active versus passive:* When funds deviate from the benchmarks, more actively managed funds tend to be countercyclical, while more passively managed funds tend to be more procyclical (Raddatz, Schmukler, and Williams, 2012). Active funds tend to retrench to the benchmark after underperforming (Broner, Gelos, and Reinhart, 2006).
- *Global versus dedicated:* Flows from dedicated single-country funds precede (Granger cause) flows from global funds, suggesting that dedicated funds hold an informational advantage (Borensztein and Gelos, 2003b).

The authors of this box are Hibiki Ichiue and Hiroko Oura.

Table 2.1.1. Key Fund Characteristics

Funds	Characteristics
Open-end	Investors can flexibly add to or redeem money from open-end funds. Inflows (redemptions) from investors create new shares (eliminate existing shares) at the fund's end-of-day net asset value. Fund managers then purchase (sell) underlying assets. If redemption pressures exceed the cash buffer held by a fund, it needs to sell assets, possibly at fire sale prices. "Mutual funds" in the United States, investment trusts (Toushin) in Japan, and UCITS in the European Union are typically open-end funds.
Closed-end	These funds issue 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 causing the purchase/sale of underlying assets.
ETF	ETFs do not directly sell ETF shares to or redeem them from ultimate investors. They issue or redeem their shares only in large blocks through APs, who are typically large broker-dealers. APs usually buy or redeem "creation units" of an ETF with a basket of securities that mirrors the ETF's portfolio, not with cash. APs can split up a creation unit and trade the individual shares on the secondary market with ultimate investors. ETFs started as index funds, but in 2008 the United States began to authorize actively managed ETFs.
Crossover	As used here, crossover funds denote global funds that are not dedicated to emerging markets but invest opportunistically in them.
Dedicated	Funds that invest only in a limited range of assets such as those from specific regions, countries, or industries.
Passive	The asset allocation strategy is fixed at the launch of passive funds and does not vary thereafter. Many passive funds are index funds, replicating the portfolio represented in their benchmark index.
Active	Managers of active funds employ dynamic asset allocation strategies, aiming at outperforming their benchmark.

Sources: Gastineau (2010); Investment Company Institute (2013); Investment Trusts Association of Japan (2013); and www.sec.gov/answers/etf.htm.
Note: AP = authorized participant; ETF = exchange-traded fund; UCITS = Undertakings for Collective Investment in Transferable Securities.

Box 2.1 *(continued)*

Table 2.1.2. Shares of Types of Mutual Funds
(Percent of total assets under management)

	Structure				Strategy		Domicile		Geography		Currency	
		Non-ETF										
	ETF	Total	Open-end	Closed-end	Active	Passive	U.S.	Offshore	Global	EM Regional	Hard Currency	Local Currency
Bond Funds												
2003	0	100	89	11	100	0	54	46	0	19	66	3
2010	7	93	89	4	93	7	58	37	56	9	27	15
2013	9	91	89	2	91	9	58	38	47	7	23	28
Equity Funds												
1996	0	100	92	8	100	0	65	20	0	38	—	—
2003	0	100	97	3	98	2	64	26	37	16	—	—
2010	19	81	79	1	77	23	50	32	35	25	—	—
2013	27	73	73	1	56	44	64	20	51	14	—	—

Sources: EPFR Global; and IMF staff calculations.
Note: Global funds correspond to those that are categorized as "Global" or "Global ex-U.S." by EPFR Global. The offshore markets are defined according to IMF (2008). Numbers may not add up due to rounding. The numbers reflect the subsamples of EPFR Global data used in our analyses. EM = emerging market; ETF = exchange-traded fund.

Evolving Emerging Market Assets and Their Investor Bases

Rising Importance of Portfolio Flows in Total Capital Flows

Gross capital flows to emerging markets have quintupled since the early 2000s, and the most volatile component—portfolio flows—has become a more important part of the mix.[4] Since the global financial crisis, portfolio flows to these economies—especially bond flows—have risen sharply (Figure 2.2). The marked swings of these flows around the time of announcements about the tapering of U.S. unconventional monetary policy have raised financial stability concerns. In contrast, deleveraging at European banks has accelerated shrinkage of cross-border banking flows. While foreign direct investment is still the largest component of capital flows to emerging markets, it has been relatively stable through a number of crises.

Growing Importance in Global Portfolios and Deepening Financial Systems

The nature of portfolio investment in emerging markets has evolved as these markets have deepened and become more globally integrated. Over the past two decades, capital markets in emerging market economies often developed in tandem with financial integration and liberalization (Box 2.2). Foreign participation in emerging market equity markets took off in the 1990s.[5] In the 2000s, changes were concentrated in fixed-income markets: many emerging market sovereigns managed to shift from issuing hard currency external debt to local currency domestic debt. In doing so, they partially overcame "original sin," a key historical source of vulnerability of emerging markets (Burger, Warnock, and Warnock, 2011).[6,7] International investors now purchase local currency debt in domestic markets and play a dominant role in some of

[4]See IMF (2013d and 2013e) for details on macrolevel trends of capital flows.

[5]See Bekaert and Harvey (2000), Henry (2000), and World Bank (2013).

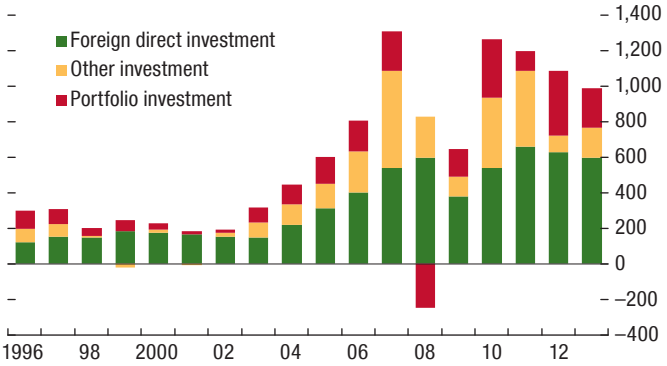
[6]Some of these trends mirror conscious policy efforts. See Felman and others (2011) and Goswami and Sharma (2011) on the Asian Bond Markets Initiative. The G20 has also emphasized the development of local currency bond markets, which led to a joint paper by the IMF, the World Bank, the European Bank for Reconstruction and Development, and the Organization for Economic Cooperation and Development, titled "Local Currency Bond Markets—A Diagnostic Framework," in July 2013.

[7]"Original sin" refers to the inability of emerging market borrowers to issue debt to foreigners in local currency (Eichengreen, Hausmann, and Panizza, 2005), which leads to currency mismatches unless accompanied by natural hedging and makes these economies more vulnerable to sudden stops of capital flows. Because of data constraints, the extent of original sin is difficult to assess for cross-border banking flows.

Figure 2.2. Trends in Capital Flows to Emerging Markets

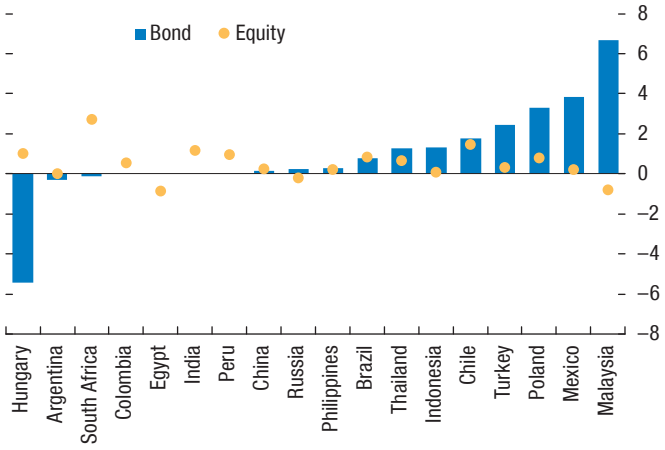
The share of portfolio flows in gross capital inflows has grown since the global financial crisis.

1. Gross Capital Inflows to Emerging Markets (Billions of U.S. dollars)



Bond flows have generally been stronger than equity flows.

2. Gross Portfolio Inflows by Country, 2009–13 (Annual average; percent of GDP)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Subgroups of capital flows follow balance of payments definition. Emerging markets include some advanced economies formerly classified as emerging markets. See Table 2.4 for sample economies.

them (Figure 2.3).[8] In international debt markets, the emerging market corporate sector has long been issuing more debt than emerging market sovereigns.[9] The share of emerging market bonds and equities in global investors' portfolios has risen sharply over the past decade, supported by their growing importance in the world economy, the decline in their relative credit risk compared with advanced economies, and low yields in advanced economies (Figure 2.4). The financial stability implications of these developments—especially the deepening of local currency bond markets with the help of larger foreign participation—are not obvious and require an empirical assessment (Box 2.2).[10]

The Role of Investor Characteristics in the Stability of Portfolio Flows

Understanding microlevel characteristics and behaviors of portfolio investors is important for assessing the stability of portfolio flows at the aggregate level. A large part of portfolio flows is intermediated by asset managers, including investment advisors for large institutional investors, mutual funds, and hedge funds. Banks and brokers that trade using their own accounts are also responsible for a portion of portfolio flows. Different investors are marked by differences in investment restrictions, degrees of regulatory oversight, investment horizon, and risk management (Box 2.3); they have varying degrees of expertise about emerging markets; and they face different risks of inflows and redemptions from their ultimate investors (see Box 2.1).[11] These differences affect the sensitivities of their emerging market investments to pull and push factors; therefore, changes in the composition of the investor base have potentially important consequences for aggregate flows.

- The volume of assets managed by mutual funds and institutional investors has grown both in emerging markets and advanced economies. No comprehensive data exist on the composition of all investors in emerging markets. As an approximation, Table 2.1 shows the size of assets managed by global and local institutional investors and mutual funds, and Figure 2.5 provides

[8]The share of foreign-currency-denominated debt securities in domestic markets is small (BIS, 2012).

[9]Chapter 1 of this *Global Financial Stability Report* (GFSR) discusses the vulnerabilities related to the emerging market corporate bond issuance boom.

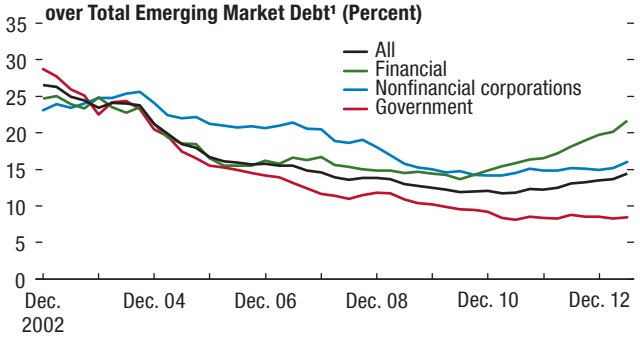
[10]See, for instance, CGFS (2007); Peiris (2010); Miyajima, Mohanty, and Chan (2012); Jaramillo and Zhang (2013); and Ebeke and Lu (2014).

[11]Institutional investors, which are defined in this chapter as pension and insurance funds, sovereign wealth funds, and central banks, are critically different from mutual funds in that they do not face immediate redemption pressures from their ultimate investors during volatile times. Jotikasthira, Lundblad, and Ramadorai (2012); Raddatz and Schmukler (2012); and Kaminsky, Lyons, and Schmukler (2004), for instance, emphasize that the volatility of open-end mutual fund investment in emerging markets is significantly driven by ultimate investors rather than by the decisions of fund asset managers.

Figure 2.3. Transformation of Investment Options in Emerging Markets

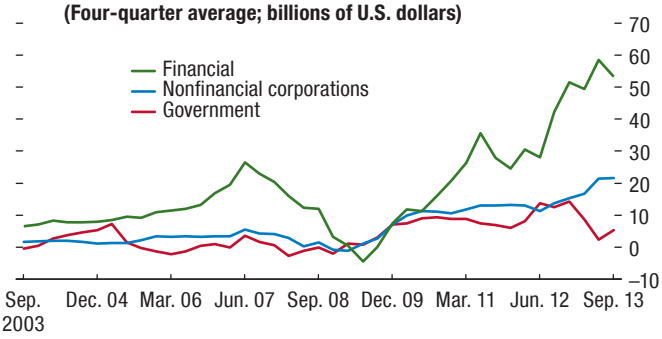
Emerging markets are shifting issuance from international to domestic debt, except for firms.

1. Share of Emerging Market Debt Issued in International Markets over Total Emerging Market Debt[1] (Percent)



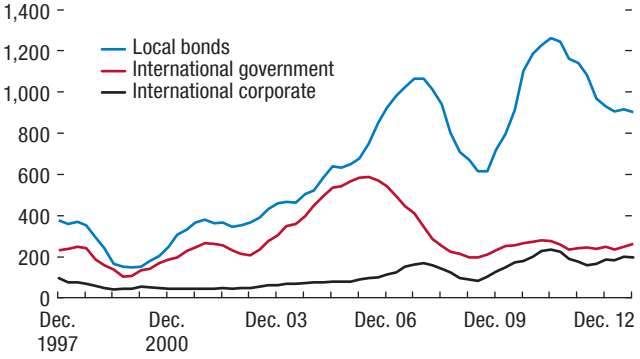
Firms now issue more international debt than governments.

2. Net Emerging Market Debt Issued in International Markets[1] (Four-quarter average; billions of U.S. dollars)



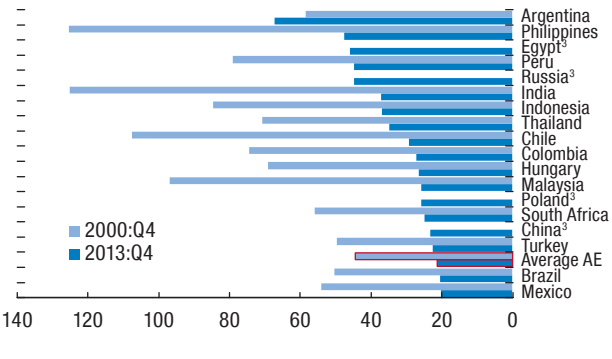
Trading volume has also shifted away from international government bonds and toward local bonds.

3. Trading Volume of Emerging Market Bonds (Four-quarter average; billions of U.S. dollars)



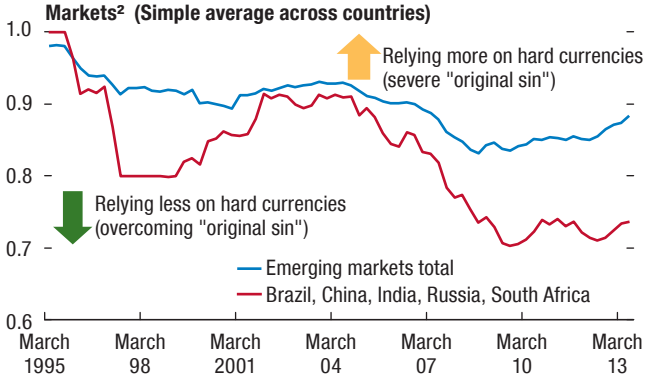
Fees and commissions for trading have declined, and some emerging markets offer cheaper trading costs than some advanced economies.

4. Equity Market One-Way Trading Costs (Quarterly average fees and commissions; basis points)



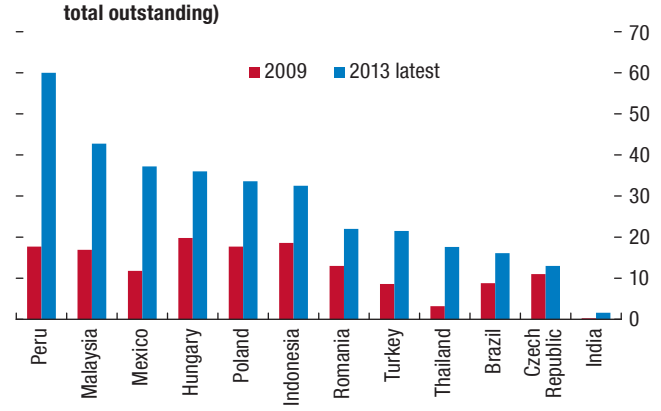
Emerging markets can now sell local currency debt to foreigners, partially overcoming "original sin"…

5. Reliance on Hard Currencies for Emerging Market Government and Nongovernment Bonds Issued in International Capital Markets[2] (Simple average across countries)



…and foreign investors have entered domestic government debt markets, increasing "external debt" in disguise.

6. Foreign Investor Participation in Local Government Bond Markets (Share of local government bond held by foreigners; percent of total outstanding)

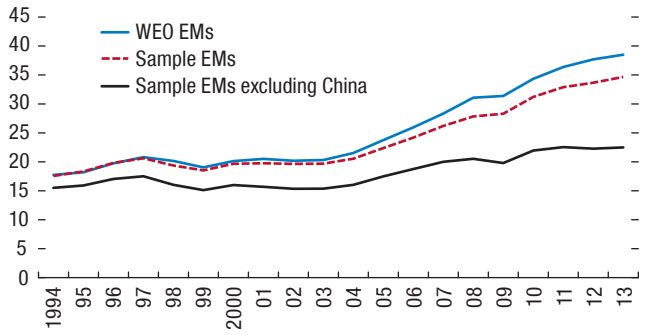


Sources: Asian Development Bank, AsianBondsOnline; Bank for International Settlements; Elkins-McSherry; Emerging Market Trading Association; J.P. Morgan; national authorities; and IMF staff calculations.
Note: AE = advanced economy.
[1]Debt issued by former and current emerging markets based on the nationality of issuers (including debt issued by foreign subsidiaries of issuers headquartered in emerging market economies). Sample includes Argentina, Brazil, China, Taiwan Province of China, Chile, Colombia, Croatia, Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Thailand, and Turkey.
[2]The figure shows the "original sin" measure following Eichengreen, Hausmann, and Panizza (2005) and is calculated as max (1-[debt issued in the currency of country i]/[all debt issued by country i], 0). Debt refers to international debt securities based on nationality issued by all sectors. Debt denominated in local currencies is assumed to be zero if data are not available.
[3]Data for 2000:Q4 are not available.

Figure 2.4. Emerging Markets: Shares in Economic Activity and Financial Markets

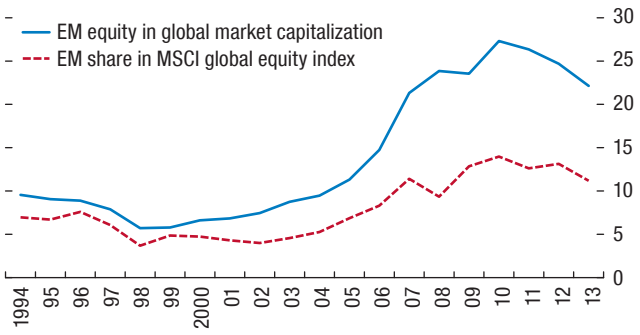
Emerging markets' share in world GDP has grown…

1. Share in Global GDP
(Percent of global GDP)



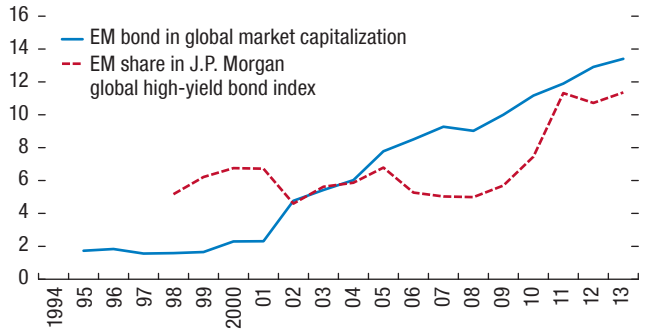
…and their share in global indices has risen, though less than their share in market capitalization would suggest.

2. Share in Global Equity Market Capitalization and Index
(Percent)



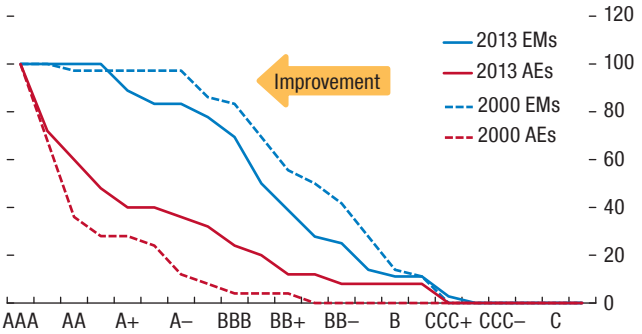
Emerging markets' share in bond market capitalization has grown, and their share in global high-yield index has caught up recently…

3. Share in Global Bond Market Capitalization and Index
(Percent)



…helped, in part, by a narrower rating gap with advanced economies.

4. Sovereign Ratings Distribution
(Cumulative distribution; percent)



Sources: IMF, World Economic Outlook database; J.P. Morgan; Morgan Stanley Capital International (MSCI); Standard and Poor's; and IMF staff calculations.
Note: AE = advanced economy; EM = emerging market; WEO EMs = emerging market economies classified as such in the World Economic Outlook database. See Table 2.4 for sample economies.

information on the allocation to emerging market assets for some subgroups of investors.

- Assets managed by mutual funds and institutional investors have grown both in nominal amounts and relative to GDP. In advanced economies, mutual funds have gained in relative importance over the past two decades, despite a decline since the global financial crisis.[12]
- Among U.S. investors, allocations to emerging market assets have increased for equities and bonds. Both institutional and retail investors have allocated more to emerging market assets (see Box 2.3). Among mutual funds, global funds with more globally diversified portfolios have strengthened their engagement in emerging markets over the past decade despite some retrenchment since 2011. Still, portfolio flows to emerging markets continue to be very small compared with those to advanced economies.
- Across regions and countries, portfolio flows from institutional investors and mutual funds have generally grown in tandem. However, institutional bond investors appear to differentiate more across regions.
- Hedge fund investment in emerging markets has stagnated since the global financial crisis.

[12]This trend in advanced economies is also pointed out in Chapter 2 of the September 2011 GFSR.

Box 2.2. Financial Deepening in Emerging Markets

Recent developments

Financial depth can be defined by the size of financial markets relative to economic activity and by the various functions those markets perform. Functions include intermediation, price discovery, and hedging. This wide range of functions can be measured by bank-based indicators (such as credit to GDP), market-based indicators (such as the market sizes for government and corporate bonds, foreign exchange, and derivatives), and indicators of financial access.

Financial markets in emerging market economies have generally deepened over the past decade but unevenly over time and across different dimensions (Figure 2.2.1). The period since the early 2000s has witnessed broad-based financial deepening in most segments of the financial systems. At the same time, growth in international government debt has been limited, partly because of emerging markets' efforts to reduce external vulnerabilities. Some market activities, such as measured by stock market capitalization, mutual fund assets, and interest derivatives, have shrunk since 2007.

Emerging markets' financial systems, however, remain thinner than those of advanced economies (AEs), with substantial variations among emerging markets (Figure 2.2.1, panels 2 and 3). In particular, emerging markets' insurance companies, mutual funds, international corporate debt, and interest rate derivatives markets are generally small compared with those of AEs. While this is not surprising—financial systems tend to deepen as countries develop—some segments of financial systems, such as the size of domestic money markets and spot foreign exchange markets, are larger in some emerging markets than in AEs.

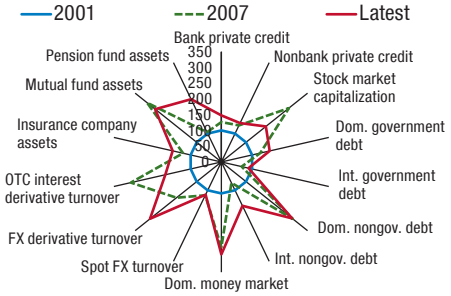
Financial deepening and economic and financial stability in emerging markets

Financial deepening does not guarantee financial stability. The benefits of financial deepening in reducing economic and financial volatility emanate mainly from the financial sector's role in allocating savings to productive use, smoothing consumption, and providing price discovery mechanisms and hedging opportunities. Empirical evidence suggests that in emerging markets, deepening financial markets—in particular stock and money markets—and making markets more liquid (as measured by reducing bid-ask spreads in

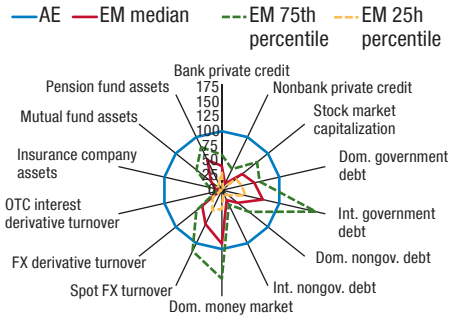
The authors of this box are Johannes Ehrentraud, Prachi Mishra, Kenji Moriyama, Papa N'Diaye, and Hiroko Oura.

Figure 2.2.1. Financial Deepening in Emerging Markets

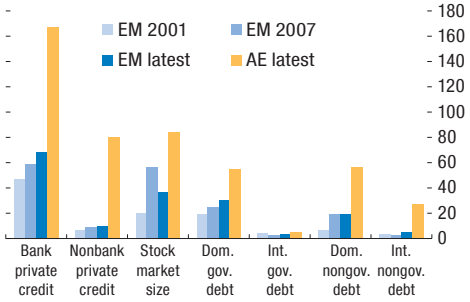
1. The Evolution of Financial Deepening in Emerging Markets (Percent of 2001 emerging market median)



2. Financial Deepening in Emerging Markets Relative to Advanced Economies (Percent of latest advanced economy median)



3. Financial System Size by Segments (Group median; percent of GDP)



Sources: Bank for International Settlements; European Fund and Asset Management Association; Organization for Economic Cooperation and Development; national mutual fund associations; World Bank, Global Financial Development database; and IMF staff calculations.
Note: AE = advanced economy; dom. = domestic; EM = emerging market; FX = foreign exchange; int. = international; OTC = over the counter. Latest data are for 2013, except for bank credit, money market instruments, and mutual fund assets (2012); and for insurance and pension fund assets (2011).

Box 2.2 *(continued)*

foreign exchange and bond markets) can enhance macroeconomic resilience. In contrast, additional benefits from deeper banking systems are likely to be more limited. Deepening debt markets on the other hand may increase economic volatility.[1]

Hence, the overall effect of financial deepening on an economy's exposure to global financial conditions explored in this chapter is ambiguous a priori. Moreover, the empirical analysis is complicated by the fact that financial deepening has often occurred alongside financial integration, and separating the effects of these two interrelated but distinct dimensions is difficult. The following summarizes recent literature on the relationship among financial deepening, asset prices, and capital flows.

- *Financial deepening and asset price sensitivity to global financial conditions:* Increased market transparency and liquidity, coupled with a broader local investor base, should allow local markets to absorb external shocks more easily. For example, a broader domestic investor base can prevent prices from overshooting or undershooting in response to sales or purchases by foreigners that are driven by external factors.[2] More liquid domestic markets can be expected to contribute to stability by reducing the price impact of capital flows.
- *Financial deepening and capital flow sensitivity to global financial conditions:* Improved local institutions, enhanced market transparency, a broader investor base, and increasingly sophisticated local investors are likely to promote price discovery and reduce herding, thereby making flows less susceptible to global conditions.[3] However, these markets could experience more volatile flows—though with lower price volatility—if global investors, facing distress, prefer to unwind their positions in deeper markets first, where the price impact is expected to be smaller.[4]

[1]The relationship between financial deepening and economic outcomes will be explored in "Financial Deepening in Emerging Markets" (IMF, forthcoming).

[2]Empirically, Alfaro, Kalemli-Ozcan, and Volosovych (2007); Chapter 3 of the April 2007 GFSR; and Broto, Díaz-Cassou, and Erce (2011) report that more developed financial sectors are empirically associated with less volatile portfolio flows. These studies, however, do not relate financial deepening to the sensitivity to global factors.

[3]Merton (1987) originally proposed the investor-base-broadening hypothesis. Wang (2007) extends the setting to discuss the role of foreign investors after financial liberalization. Umutlu, Akdenizb, and Altay-Salih (2010) find empirical support for this hypothesis.

[4]Broner and Ventura (2010) develop a model in which countries with deeper financial markets experience more volatile capital flows due to changes in investor sentiment.

Identifying the Financial Stability Effects of Changes in the Investor Base and in Local Financial Systems

Approach

This section examines how changes in the investor base and in local financial systems of emerging market economies have affected portfolio flows and asset prices in these economies.

- *The evolving role of global and local factors over time:* We document the evolution of correlations in emerging market asset returns with global asset returns. We then consider whether macro fundamentals have become more important over time in explaining cross-country differences of emerging market asset returns during crises (Box 2.4). This section also explores trends in investor herd behavior.
- *Investor characteristics and portfolio flows:* We measure the sensitivity of portfolio flows to global risk factors by estimating a panel model with global and domestic factors. The focus is on differences in sensitivities to global risk factors across types of investors. Since investors may behave differently when faced with extreme shocks, flows of mutual funds and institutional investors are also examined specifically around crises.
- *Local financial systems and emerging market asset prices:* We explore the impact of financial deepening on the sensitivity of emerging market asset returns to global risk factors using a technique similar to that for portfolio flows.[13] The panel model includes various global push and domestic pull factors. The analysis encompasses the role of local investors, who

[13]Annex 2.1 shows additional results on the relationship between local macroeconomic indicators and asset prices and flows.

Box 2.3. Investment Strategies of Institutional Investors

Over the past decade, institutional investors have been allocating more funds to emerging markets. Despite differences in mandates (Table 2.3.1), all types of institutional investors are attracted to emerging market assets by their relatively high returns. Economic growth trends, real currency appreciation, and deepening capital markets in emerging market economies have spurred the demand for emerging market assets.

- For pension funds, the decline in funded ratios led them to pursue higher returns by relaxing investment constraints. They have been diversifying asset classes, in particular to include local currency debt in emerging markets (J.P. Morgan Asset Management, 2009). Their current allocations to emerging market assets are still low, however. Allocation to emerging markets is expected to rise to 10 to 20 percent over the longer term (OECD, 2013).
- Insurance firms have increased their exposures to emerging markets since 2008 (despite a minor setback in 2012–13; Figure 2.3.1, panel 1), and interest continues to grow (*Financial Times,* 2013). In a recent survey of investment officers (Siegel and Morbi, 2013), more than 40 percent of insurance companies intended to increase their allocations to equity and to hard currency corporate debt in emerging Europe, the Middle East and Africa, and emerging Asia. Investment officers expect a 30 percent increase for emerging markets.
- Central bank reserve managers, who collectively handle $11 trillion in assets, tend to be conservative investors. Nonetheless, they do invest in emerging markets, and the most popular of those destinations have been Brazil, China, Korea, Mexico, Poland, South Africa, and Turkey. Reserve managers are also raising their allocation to emerging markets in line with their economic size and diversifying away from hard currencies (Figure 2.3.1, panel 2).
- Sovereign wealth funds have progressively expanded their exposure to emerging markets, especially to Brazil, China, India, Russia, and Turkey. Total deal flows, concentrated in equity acquisition, peaked in 2010 at $20 billion, then receded to $10 billion in 2013 (Figure 2.3.1, panel 3).

The author of this box is Sofiya Avramova.

Table 2.3.1. Investment Constraints of Institutional Investors

Investor Type	Risk Tolerance	Time Horizon	Need for Liquid Assets	Regulatory Constraints
Private Pension Plan (defined-benefit)	Determined by surplus, age of workers, balance sheet	Long	Depends on age of workers and percent of retirees to total workforce	High
Life Insurance	Fixed-income conservative Surplus aggressive	Medium to long	Fixed-income high Surplus low	High
Non–Life Insurance	Fixed-income conservative Surplus aggressive	Short	Fixed-income high Surplus low	Moderate
Central Bank Reserve Funds	Depends on international reserve amount and adequacy	Short	Medium to high	Moderate
Sovereign Wealth Funds				
Fiscal Stabilization Fund	Depends on fiscal budget, conservative	Short	Mostly government bonds with high liquidity	Light
Savings Fund	High risk-return profile	Long	Primarily equity and alternatives with low liquidity	Light
Public Pension Fund	Medium, high allocation to equity to hedge wage growth	Long	Depends on immediacy of contingent claims, medium to low	High
Sovereign Wealth Reserve Fund	Higher risk-return profile	Long	Low	Light

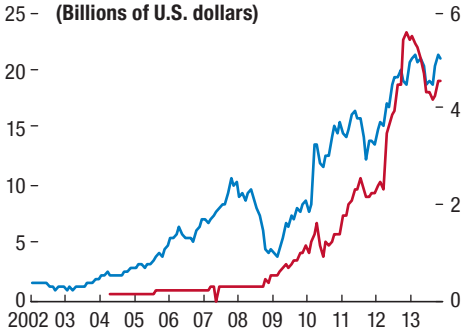
Sources: Al-Hassan and others (2013); Chartered Financial Analyst Institute Curriculum; Papaioannou and others (2013); and Morahan and Mulder (2013).
Note: The insurance surplus is assets above the reserves set aside for future insurance payout and is used to develop new business; it has a higher risk-return profile than the reserves that are usually invested in fixed-income assets.

Box 2.3 *(continued)*

Figure 2.3.1. Investments of Institutional Investors in Emerging Markets

Insurance companies are investing more in EMs, but they pulled back mildly around the tapering announcement in 2013.

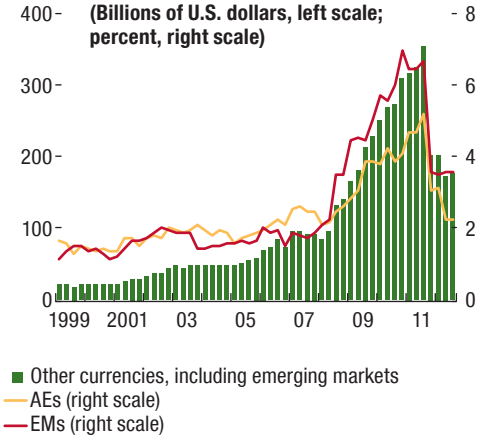
1. Insurance Companies' Investment in Emerging Markets (Billions of U.S. dollars)



Sources: EPFR Global; and IMF staff estimates.
Note: The sample includes about 4 percent of insurance firms in Organization for Economic Cooperation and Development economies.

Foreign reserve managers have been cautiously diversifying out of hard currencies.

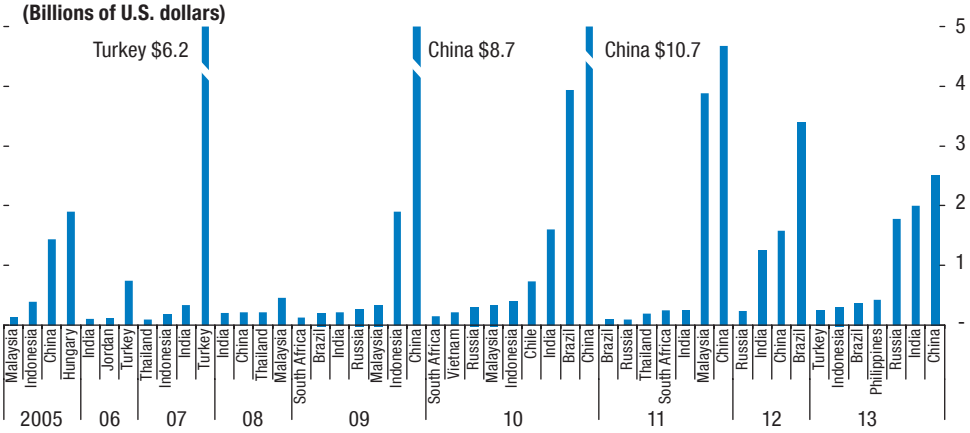
2. Foreign Reserves Asset Allocation by Currency (Billions of U.S. dollars, left scale; percent, right scale)



Source: IMF Currency Composition of Official Foreign Exchange Reserves database.
Note: Currencies other than those of the G7, Australia, and Switzerland. Data up to 2012 classify Canadian and Australian dollars as other currencies. Data with unknown currencies are excluded.

Brazil, China, India, Russia, and Turkey continue to attract sovereign wealth fund capital.

3. Sovereign Wealth Funds' Capital Flows by Country (Billions of U.S. dollars)



Source: SWF Institute.
Note: AE = advanced economy; EM = emerging market; SWF = sovereign wealth fund. Minimum investment is set at $100 million. The SWF Institute data cover about 53 percent of the capital flows to EMs in 2012. The data cover mainly investments in equity, real estate, and infrastructure.

Table 2.1. Size of Global and Local Institutional Investors and Mutual Funds
(Trillions of U.S. dollars, unless indicated otherwise)

	1995	2000	2005	2007	2009	2011	2012
Assets under management of mutual funds and institutional investors							
Selected advanced economies[1,2]							
Total assets	22	35	53	68	65	70	76
Total as percent of GDP	96	143	159	179	172	167	180
Mutual funds	6	13	19	26	25	26	29
Of which							
Share of open-end funds in total mutual fund assets (percent)[3]	94	97	96	97	97	97	97
Institutional investors	16	23	34	41	40	44	47
Share of institutional investors in total assets (percent)	72	64	64	61	61	63	61
Selected emerging market and other economies[2,4]							
Total assets	. . .	. . .	2.3	4.4	4.8	6.4	. . .
Total as percent of GDP[5]	. . .	. . .	32	36	37	36	. . .
Mutual funds	. . .	. . .	0.8	1.9	1.9	2.3	. . .
Institutional investors	. . .	. . .	1.5	2.5	2.9	4.1	. . .
Share of institutional investors in total assets (percent)[5]	. . .	. . .	65	59	60	62	. . .
International reserves, excluding gold							
Advanced economies[1]	0.7	0.8	1.3	1.5	1.8	2.3	2.5
Emerging market and other economies[4]	0.4	0.7	2.0	3.6	4.7	5.9	6.2

Sources: IMF, International Financial Statistics and World Economic Outlook databases; Organization for Economic Cooperation and Development; World Bank, Global Financial Development database; and IMF staff estimates.

[1]Including Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Japan, Luxembourg, Netherlands, Norway, Spain, United Kingdom, and United States.

[2]These data may reflect some double-counting of assets, such as those owned by pension funds and managed by mutual funds.

[3]The data include Australia, Finland, France, Greece, Spain, United Kingdom, and United States.

[4]Including Argentina, Brazil, Chile, China, Colombia, Croatia, Czech Republic, Egypt, Hungary, India, Indonesia, Korea, Latvia, Lithuania, Malaysia, Mexico, Morocco, Nigeria, Peru, Philippines, Poland, Russia, South Africa, Sri Lanka, Thailand, Turkey, Uruguay, and Vietnam. Mutual fund data for China start in 2007.

[5]Excluding China.

hold the largest share of emerging market bonds (Figure 2.1).

These analyses cover a wide range of emerging markets, including former emerging and frontier markets (Table 2.4 in Annex 2.1). Annex 2.1 describes the details of the data and empirical frameworks.

The Evolving Role of Global and Local Factors

As emerging markets have become increasingly integrated with global markets, global factors have increasingly driven emerging market asset returns (Figure 2.6).[14] Although the heightened correlation of local asset returns with global market returns (beta) during the global financial crisis may partly reflect the effects of higher asset volatility typical of weak markets, equity beta has remained at high levels (above one) since then. The beta for emerging market bonds (especially those denominated in the local currency) is much lower than that for equities but is rising rapidly.

Although country-level macroeconomic conditions in emerging markets (pull factors) matter for asset price resilience, their role during distress episodes does not seem to have risen since the late 1990s. Looking at distress episodes for emerging markets since the Asian crisis, it does not seem that the relative role of macroeconomic fundamentals in explaining contagion patterns has been rising over time (Box 2.4). This could be partly because macroeconomic vulnerability has been reduced in many emerging markets in the past 15 years, keeping them within a comfort zone for many global investors despite global turbulences.[15]

At the same time, herding among international equity investors is on the rise (Figure 2.7). If international investors buy or sell assets simply because they observe other investors doing so, this can amplify

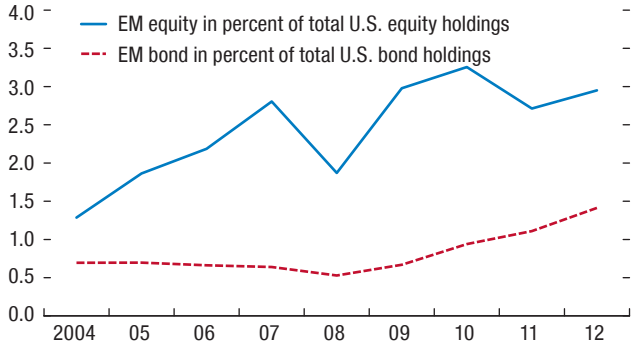
[14]See Forbes (2012), Bekaert and others (2011), and Bekaert and Harvey (2000) on equity market integration. See Burger, Warnock, and Warnock (2011) and Miyajima, Mohanty, and Chan (2012) on bond market integration.

[15]Dynamics within volatility periods also change: after an initial generalized sell-off in May and June 2013, financial assets of emerging markets with better macroeconomic fundamentals recovered more strongly than those with weaker fundamentals in the following months (Box 2.4).

Figure 2.5. Allocation to Emerging Market Assets

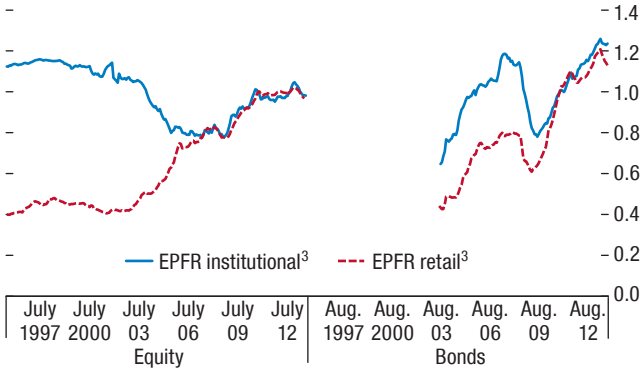
U.S. investors (including both mutual funds and institutional investors) have increased their allocations to emerging markets.

1. Share in U.S. Investors' Portfolios[1] (Percent)



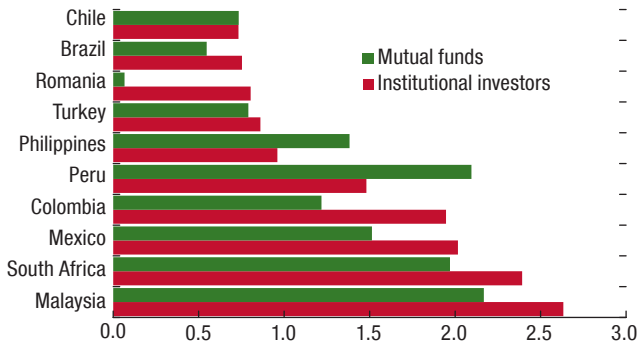
More recently, retail investors have also been increasing their engagement in emerging markets.

2. Emerging Market Assets in Global Investors' Portfolio Flows (Cumulative flows to EMs; relative to cumulative flows to other economies, December 2010 = 1)[2]



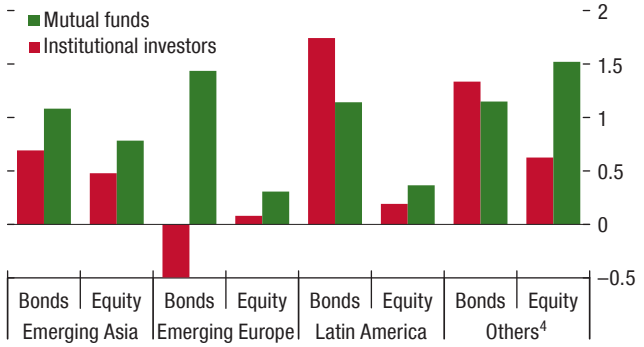
Mutual funds and institutional investors have largely invested in the same countries, although the relative size of both types of inflows has varied somewhat across countries.

3. Bond Flows by Types of Investors (Net inflows between October 2008 and September 2013; percent of GDP)



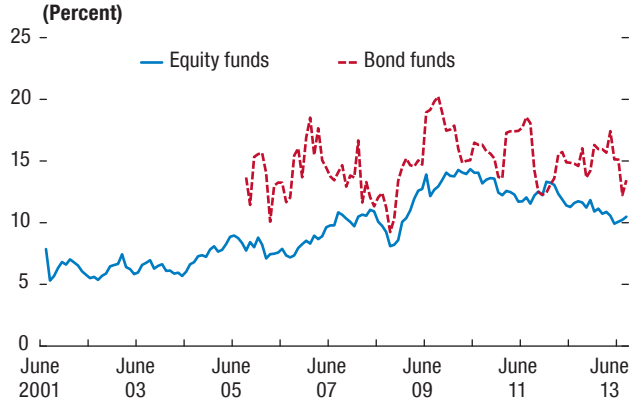
In emerging Europe, institutional investors pulled back since the global financial crisis, while mutual funds continued to invest.

4. Portfolio Inflows, by Region and Investor Type (Net inflows between October 2008 and September 2013; percent of GDP)



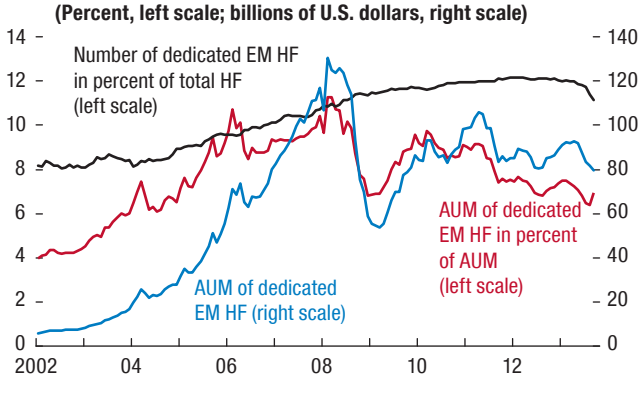
The role of emerging markets in global funds' portfolios has become more important, despite a recent setback…

5. Share in Global Mutual Funds' Assets (Percent)



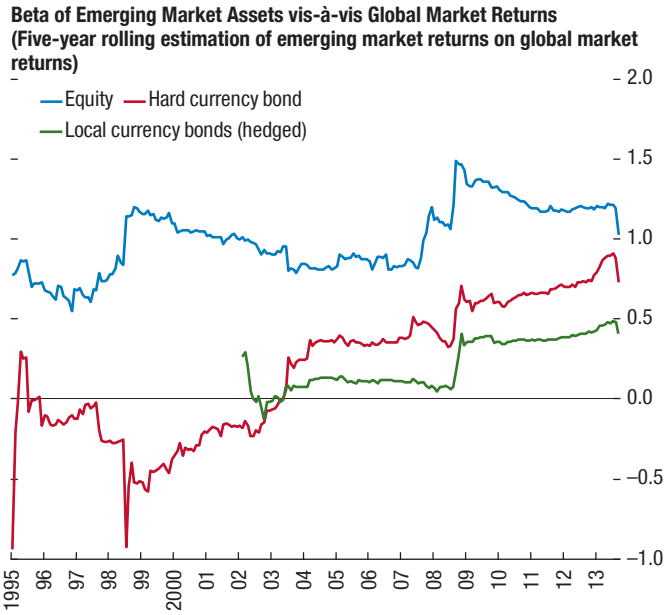
…while hedge fund investments in emerging markets have stagnated since 2008.

6. Dedicated Emerging Market Hedge Funds (Percent, left scale; billions of U.S. dollars, right scale)



Sources: Bank of New York Mellon; EPFR Global; Federal Reserve; Hedge Fund Research; U.S. Treasury International Capital System, and IMF staff estimates.
Note: AUM = assets under management; EM = emerging market; HF = hedge funds.
[1]U.S. portfolios include both domestic and foreign securities.
[2]Cumulative flows are calculated using monthly flows-to-assets under management in order to control for expanding coverage of the data. Data end in October 2013.
[3]See Annex 2.1 for EPFR Global definitions for institutional and retail investors.
[4]Others include Egypt, Israel, and South Africa.

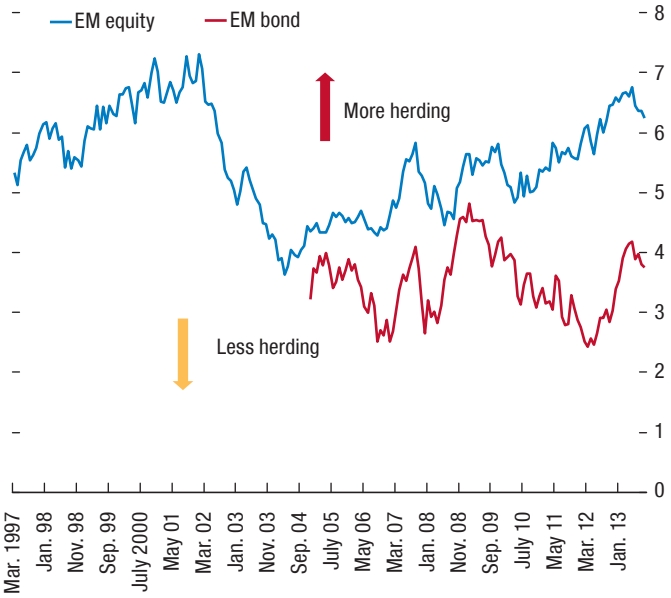
Figure 2.6. Integration of Emerging Market Assets into Global Markets



Source: IMF staff estimates.
Note: Betas are coefficients estimated by regressing returns of emerging market assets on global market returns, using a monthly panel model with country fixed effects and a five-year rolling window. If beta is negative, then the return of the asset rises when the overall market is declining, and that asset provides better diversification benefits for investors. If beta is above 1, then the asset is not only highly correlated with the market return but also rises or falls more than the market return. Global market returns are measured using the S&P 500 Index for equities and the City World Government Bond Index for both hard currency and local currency sovereign bonds. Both country and global market returns are measured in excess of the one-month Eurodollar deposit rate.

Figure 2.7. Herding among Equity and Bond Funds Investing in Emerging Markets

(Percent)



Sources: EPFR Global; and IMF staff estimates.
Note: EM = emerging market. The herding measure is that proposed by Lakonishok, Shleifer, and Vishny (1992). It assesses the strength of correlated trading among mutual funds investing in EMs, controlling for their overall trade trends (see Box 2.5). The measure is 0 when there is no sign of herding. It is calculated every month, looking at the fund-level activity in each country, and then averaged across EMs. The measure is computed when there are at least six funds in a month.

boom-bust cycles in financial markets (Box 2.5). In principle, as information about emerging markets becomes more widely available and coverage by country analysts increases, country fundamentals should become more important determinants of investment decisions, and herding among international investors should decline (Calvo and Mendoza, 2000). However, there is little evidence of such a shift over the past 15 years. For equity funds, herding behavior—measured by the extent to which a certain group of investors trades in the same direction more often than one would expect if they traded independently and randomly—weakened somewhat in the first half of the 2000s but has continuously climbed since then. The low-interest environment since the mid-2000s may have contributed to this rise, as investors searched for yield, neglecting country-specific risks and following other investors. Although there is no clear trend for bond funds, herding tends to pick up during turbulent times, and has been rising over the past two years, as well.[16]

Investor Characteristics and Portfolio Flows

Bond Fund Flows versus Equity Fund Flows

Bond flows are much more sensitive to global financial conditions than equity flows. Separate econometric analyses for bonds (covering both sovereign and corporate bonds) and equities (using country-level EPFR Global data for mutual fund flows and BNY data for institutional investors) reveal a stark contrast between bond and equity investors. Figure 2.8, panel 1, compares the sensitivity of bond and equity flows from mutual funds and institutional investors to a one standard deviation rise (about 8½ percentage points) in

[16]Note that a common move by global funds to emerging markets with better fundamentals during a period of volatility would also show up in our measure as a temporary spike in herding (see Box 2.5).

Box 2.4. Are Investors Differentiating among Emerging Markets during Stress Episodes?

Over the past 15 years, the impact of crises was not uniform across emerging markets, and the literature has sought to identify the macroeconomic conditions that determine the susceptibility of countries to shocks.[1] We assess whether variations in domestic macroeconomic fundamentals across emerging markets are increasingly influencing market participants in their investment decisions during crises.

Method

Our study compares the cross-country pattern of asset price movements during six crises affecting emerging markets. For each event, we estimate the relationship between market pressure and macroeconomic variables across emerging markets, then compare the explanatory power (measured by the *R* squared) of the macroeconomic variables across episodes to see whether markets have become more discriminating over time.

- *Crises:* The analysis covers the Thai, Russian, and Brazilian crises; the global financial crisis; the European crisis; and the 2013 sell-off episode owing to concerns over U.S. monetary policy.
- *Market pressure:* Market pressure is measured by changes in exchange rates, an index of exchange market pressure, and bond and equity prices between the beginning and the end of an episode.
- *Macroeconomic variables:* Given the small sample size for each stress episode, we use only a few key macroeconomic variables from the literature: the inflation rate, the current account balance, a measure of trade linkages with the country where the crisis originated, and a measure of financial openness. All macroeconomic variables are taken prior to the crisis episode to reduce endogeneity concerns.

The limited sampling and highly varied crises mean that the results should be interpreted as only indicative.

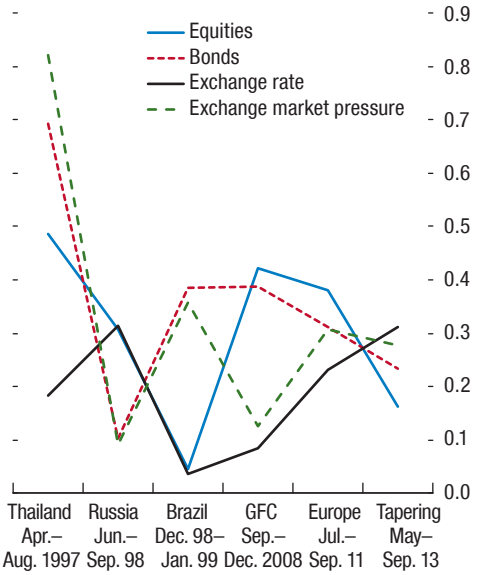
Results

The role of individual macroeconomic variables appears to be tied both to specific markets and to specific crises. Trade linkages and inflation have played a significant role across multiple types of crises and for several types of assets. Countries with a stronger trade connection with the shock-originating economy experience higher market pressure on asset prices. Markets also seem to exert more pressure on countries with higher inflation. The current account balance, which has been flagged as an important determinant of pressure on emerging market asset prices, does not appear to be a robust influence.[2]

The explanatory power of fundamentals across crises does not suggest that investors are becoming more discriminating among emerging markets according to differences in their macroeconomic fundamentals (Figure 2.4.1).[3] However, within the tapering-related sell-off episode in 2013, the *R* squared of macroeconomic fundamentals rose over time. Market participants agree that investors started to differentiate more across countries over the summer 2013 after the initial generalized sell-off in May and June.

Figure 2.4.1. Role of Macroeconomic Fundamentals over Time

Macroeconomic Fundamentals Explanatory Power across Stress Episodes
(*R* squared of separate cross-country regressions by episode)



Source: IMF staff calculations.
Note: GFC = global financial crisis. The dependent variables are changes in exchange rates, bond and equity prices, and an exchange market pressure index over the crisis periods. Explanatory variables are trade linkages, consumer price inflation, ratio of current account balance to GDP, and financial openness. Models are estimated by ordinary least squares with robust standard errors. See Table 2.4 for sample economies and Table 2.5 for variable definitions.

The author of this box is Nicolás Arregui.

[1]See Aizenman and Pasricha (2012); Feldkircher, Horvath, and Rusnak (2014); and Eichengreen and Gupta (2013).

[2]See Chapter 1 of the October 2013 GFSR and IMF (2014).

[3]The results are robust to the use of additional controls, including the real effective exchange rate appreciation, real GDP growth, the fiscal balance in percent of GDP, total foreign debt in percent of GDP, an indicator for the exchange rate regime, and the size of the economy.

Box 2.5. Measuring Herding

Herding in financial markets emerges when investors mimic other investors. Such behavior can destabilize financial markets, aggravate shocks, and lead to mispricing or asset price bubbles. While herding can be the result of cognitive biases or of "heuristic"-based decision making, it can also be rational. For instance, herding may emerge if less-informed asset managers follow their possibly better-informed peers instead of relying on their own assessments (Bikhchandani, Hirshleifer, and Welch, 1992). Herding may also be rational for asset managers if they are evaluated against each other (Scharfstein and Stein, 1990) or vis-à-vis similar benchmarks (Maug and Naik, 2011).

We use a herding measure that quantifies comovements in trading patterns for a subgroup of investors—here, international funds investing in emerging markets. This measure, originally introduced by Lakonishok, Shleifer, and Vishny (1992), assesses whether funds move in the same direction more often than one would expect if they traded independently and randomly. The herding measure (*HM*) is the average across countries of the following country-specific herding metric:

$$HM_{c,t} = |p_{c,t} - p_t| - AF_{c,t}, \qquad (2.5.1)$$

where $p_{c,t}$ is the proportion of all funds active in country c and month t that are net buyers ($1 - p_{c,t}$ is the proportion of net sellers), p_t is its expected value, and $AF_{c,t}$ is an adjustment factor to ensure that $HM_{c,t}$ is zero if there is no herding.[1] p_t is approximated by the share of funds that are net buyers across all emerging markets in our sample, and is allowed to be time-varying to control for common trends across countries, such as swings in aggregate inflows to emerging markets due to marketwide developments.[2]

Since $HM_{c,t}$ measures the correlation in trading patterns, it gives only indicative evidence of "true" herding.[3] A positive value of the measure in a given period may also reflect, for instance, the inclusion of a country in a benchmark index or regulatory changes affecting this subgroup of investors in specific countries. However, a generalized market reaction to fundamental news should not necessarily result in spurious positive herding values with this measure, since, for example, not everybody can react to bad news by selling: there must be a buyer for every seller. Consequently, for *HM* to misclassify a reaction to news about fundamentals as herding, news must either (1) fundamentally affect the group of mutual funds studied here in a different manner than other investors or (2) propagate slowly across different types of investor groups (which should not be an important issue at the monthly frequency; see Cipriani and Guarino, 2014).

The authors of this box are Johannes Ehrentraud and Hibiki Ichiue.

[1]The adjustment factor is equal to the expected value of the first term under the null hypothesis that there is no herding. It is needed since the distribution of the first term is not centered around zero.

[2]In this chapter, we show that mutual funds react more to global financial shocks than do other investors. To the extent that this results in uniform relative changes in emerging market allocation across countries, this effect is controlled for by p_t.

[3]See the discussions in Bikhchandani and Sharma (2001) and Cipriani and Guarino (2014).

the VIX (the Chicago Board Options Exchange Market Volatility Index).[17] In the case of mutual funds, bond flows are clearly more sensitive to the VIX than equity funds. For institutional investors, however, the difference between the sensitivity of bond and equity funds is not statistically significant.[18]

Institutional Investors versus Mutual Funds

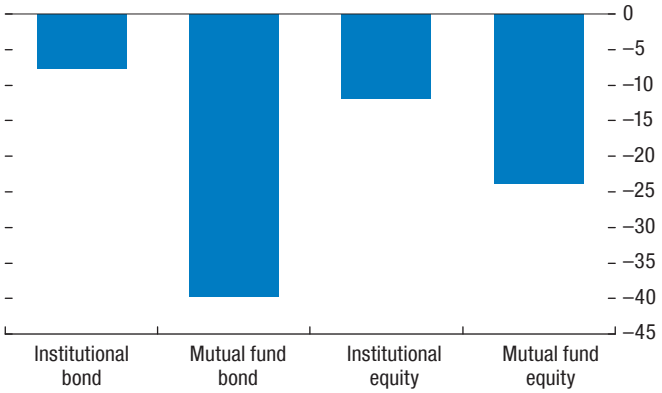
As expected, global mutual funds react more strongly to global financial shocks than do large global institutional investors (Figure 2.8). The results confirm that flows from retail-oriented mutual funds (EPFR Global data) are significantly more sensitive to the VIX than flows from the institutional investors (BNY data) for both bonds and equities. This may reflect the fact that

[17]The results are based on panel regressions for bond and equity flows from mutual funds and institutional investors on various global and domestic factors. See Annex 2.1 on details of the mutual fund flow data calculations.

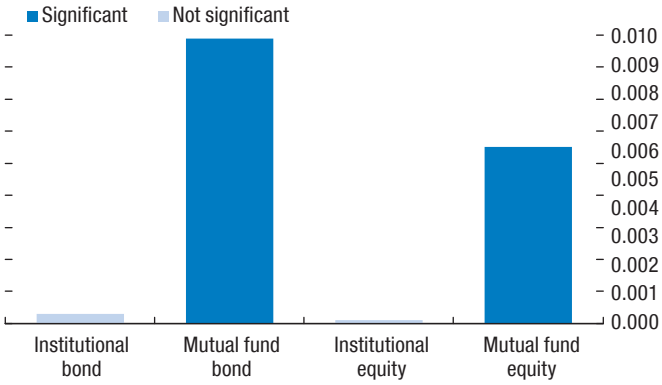
[18]The results are generally robust when other measures of global factors are used, including the volatility of the two-year Eurodollar interest rate future; the Merrill Lynch Option Volatility Estimate (MOVE) index; and the Treasury and Eurodollar (TED) spread. Our results and other research (see for example González-Hermosillo, 2008; Fratzscher, 2012; and Rey, 2013) suggest that different sets of global factors are relevant for emerging market portfolio flows and asset returns. Similarly, IMF (2013d and 2013e) and Chapter 1 of the April 2013 GFSR find that global factors such as the VIX and—to a lesser extent—government bond yields have played a significant role in explaining swings in portfolio flows to emerging markets. In general, however, the VIX—often interpreted as a measure of global risk aversion—is the factor that plays a significant and robust role.

Figure 2.8. Mutual Fund and Institutional Investor Flows

1. Sensitivity of Portfolio Flows to Emerging Markets to the VIX by Type of Investors and Assets
(Changes of flows when the VIX increases by one standard deviation; percent of standard deviation of flows)



2. Evidence for Momentum Trading
(Estimated coefficient on lagged country index returns)



Sources: Bank of New York Mellon; EPFR Global; and IMF staff estimates.
Note: ICRG = *International Country Risk Guide;* VIX = Chicago Board Options Exchange Market Volatility Index. Each type of monthly flow is regressed on the VIX, the lagged change in the ICRG country risk index, the real interest rate differential, and the lagged country index return. Estimation period is December 2000–October 2013. One standard deviation of the VIX is about 8½ percentage points. See Annex 2.1 for the details of method, Table 2.4 for sample economies, and Table 2.5 for the definition of variables.

institutional investors have limited redemption pressures and that they allocate assets following long-term investment strategies.[19]

Mutual funds are also more likely to engage in return chasing, creating more procyclical flows. The significant, positive coefficient in Figure 2.8, panel 2, for recipient economies' asset returns indicates that bond mutual funds and, to a lesser extent, equity mutual funds favor countries with high recent returns. Such momentum trading amplifies cyclical swings of portfolio flows and can be destabilizing. Institutional investors, on the other hand, do not engage in this type of behavior.

Institutional investors, however, are not always more stable: they pull back more strongly from bond markets than do mutual funds when faced with extreme shocks (Figure 2.9). Institutional investors' bond flows dropped more appreciably than those of mutual funds after the September 2008 Lehman Brothers shock, although their flows have been more resilient than mutual fund flows and have even grown during other episodes of distress. Moreover, institutional investors reduced their bond exposure more persistently than did mutual funds when a country was downgraded to below investment grade. One factor in this behavior is that institutional investors typically face tighter limits on the ratings of the securities they can hold than do mutual funds (Box 2.3). In contrast, institutional investors' equity allocations were broadly unaffected by sovereign downgrades or the Lehman Brothers shock. These investors typically do not change their investment strategies frequently, irrespectively of short-term market fluctuations. However, once a strategy to shift away from certain emerging markets is adopted, the effects can be persistent.

Hedge funds have shown a mix of behaviors during stress episodes. In principle, hedge funds can trade in a destabilizing manner. But they can also behave as contrarians and thus smooth market turbulences because they face fewer portfolio restrictions (see Ilyina, 2006). Hedge funds, especially those that are leveraged, pulled back substantially during the global financial crisis, although they maintained their exposures in 2013 (Figure 2.9). Moreover, market participants suggest that some hedge funds are becoming similar to mutual funds in terms of transparency and investment strategies because many of them now serve more conservative institutional investors, such as pension funds. Among dedicated emerging market hedge funds, about 40 percent are leveraged, down from about 50 percent in 2008.

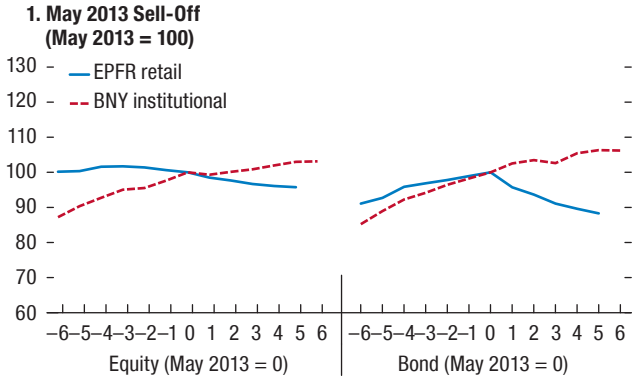
Flows from Different Types of Mutual Funds

Different types of mutual funds show distinctive sensitivities to global financial shocks. The key results from

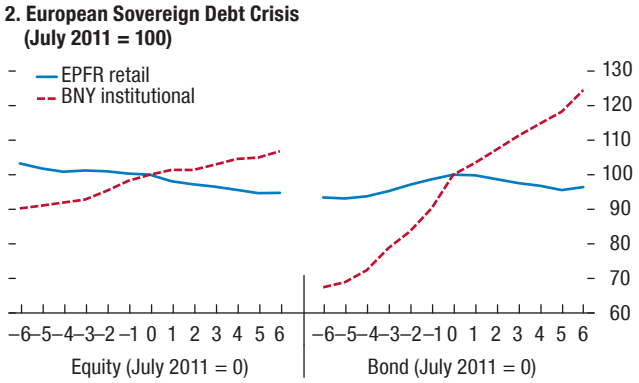
[19]For instance, *Financial Times* (2014a) reports intense redemptions by retail investors in January 2014.

Figure 2.9. Cumulative Monthly Portfolio Flows to Emerging Markets from Different Types of Investors during Distress Episodes

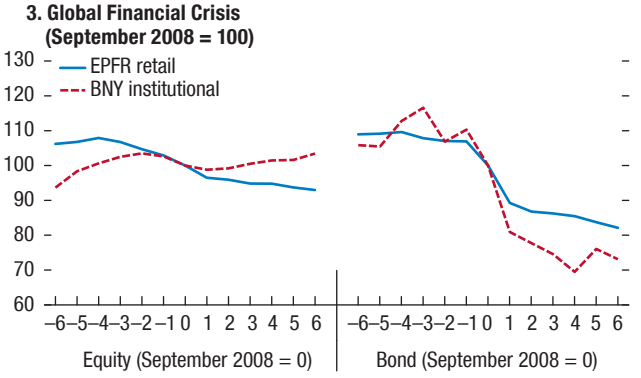
Institutional investors continued to add money to emerging markets while retail investors pulled back in 2013…



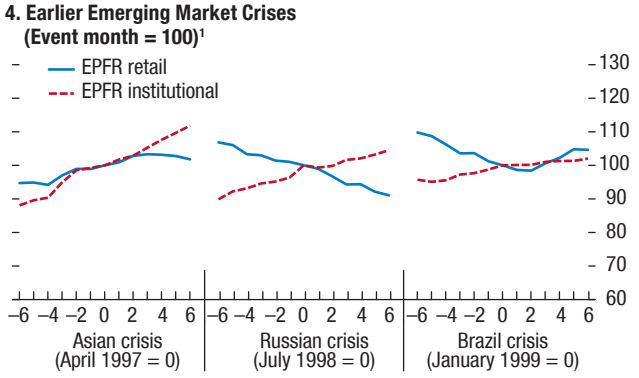
… and during the European sovereign debt crisis…



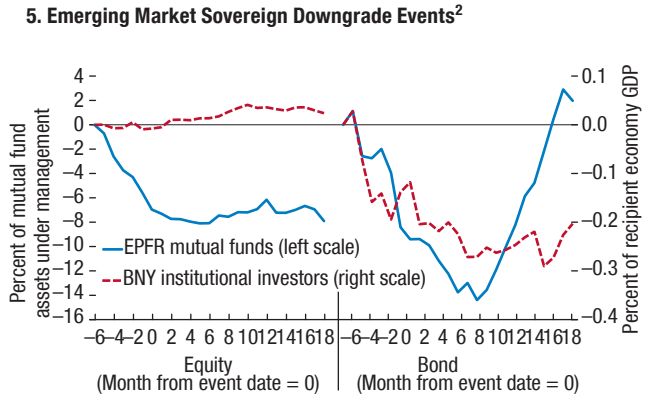
…but institutional investors withdrew more than retail investors from bonds after the Lehman Brothers shock.



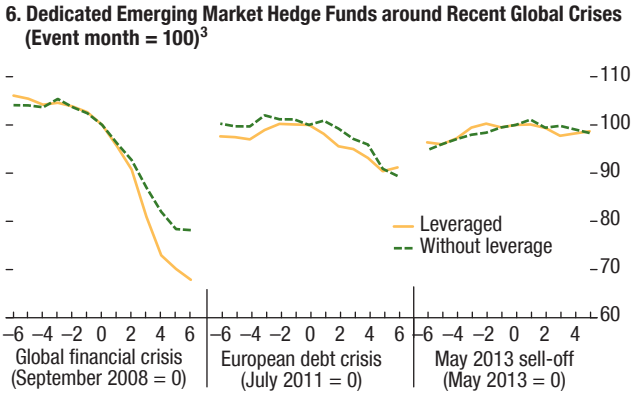
Institutional investor flows were more resilient and often continued to rise during past emerging market crises.



However, institutional investors withdrew more persistently than retail-oriented mutual funds from sovereign bonds downgraded below investment grade.

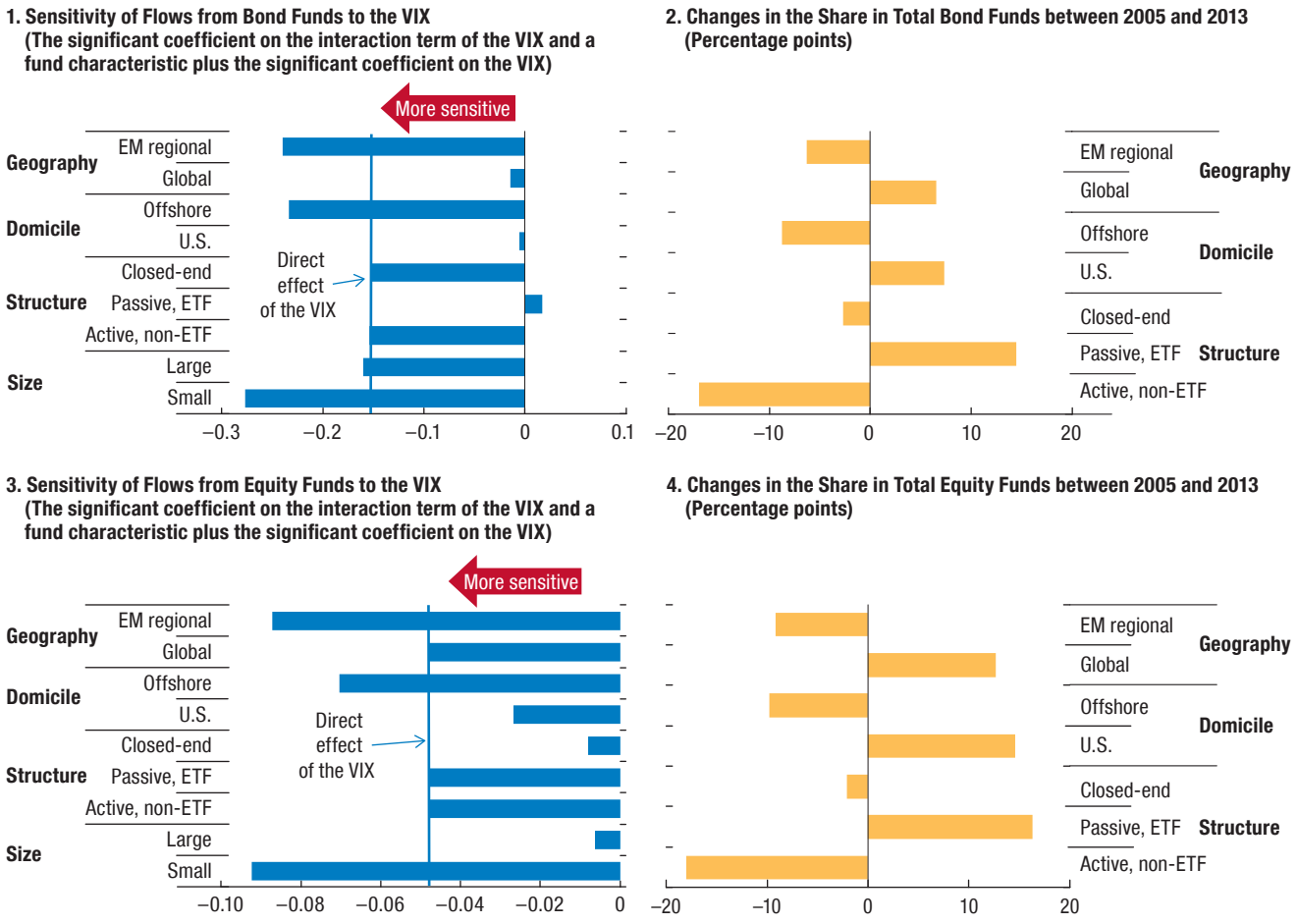


Hedge funds, especially leveraged ones, pulled back from emerging markets in 2008 and to a lesser extent in 2011, but their exposures remained unchanged in 2013.



Sources: Bank of New York Mellon (BNY); EPFR Global; Eurekahedge; and IMF staff calculations.
[1]See Annex 2.1 for the definition of EPFR retail and EPFR institutional investors.
[2]The data are average flows for five episodes in which sovereigns were downgraded to below investment grade between 2000 and 2013 when institutional investor data are available: Croatia, 2012; Egypt, 2002; Hungary, 2011; Latvia, 2009; and Romania, 2008.
[3]Flows are estimated by adjusting changes in assets under management with returns at the fund level. In distress periods, funds tend to increase their cash holdings, so the outflows from emerging markets may then be even greater.

Figure 2.10. Flow Sensitivity to Global Financial Conditions by Fund Characteristics



Source: IMF staff estimates.
Note: EM= emerging market; ETF = exchange-traded funds; VIX = Chicago Board Options Exchange Market Volatility Index. Panels 1 and 3 summarize the results of panel regressions with country-fund fixed effects. A value of –1 means that a 1 percentage-point increase in the VIX reduces flows by 1 percent of assets under management per month. The dependent variables are monthly equity and bond flows of individual funds into individual countries as a proportion of the funds' assets allocated to the country. The independent variables consist of the VIX, its interaction with one dummy variable representing a fund characteristic, and control variables. All independent variables are demeaned. Estimation periods are December 2003–September 2013 for bond funds and March 1996–October 2013 for equity funds. See Annex 2.1 for details, Table 2.4 for sample economies, and Table 2.5 for definitions of variables. Box 2.1 provides the definition of fund characteristics. Active non-ETF funds are mostly actively managed open-end funds. Panels 1 and 3 show the sum of the two coefficients only when they are significant at the 5 percent level. Panels 2 and 4 do not show the share of small and large funds because size indicators are relative to the total sample.

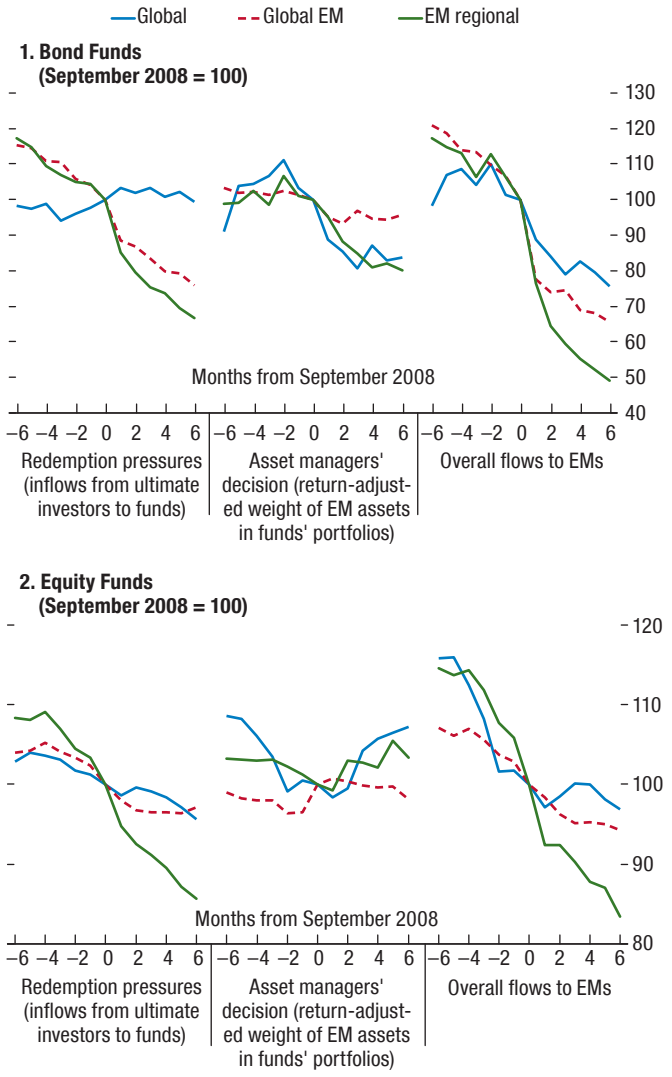
a comparison of their flows' sensitivity to the VIX (Figure 2.10, panels 1 and 3) are as follows:[20]

- For fixed-income funds, active funds that are not exchange-traded funds (ETFs) (mostly actively managed open-end funds, which are the majority of mutual funds; see Box 2.1), are more sensitive to global financial conditions than are passive ETFs.
- Closed-end funds, especially for equity, seem to be less reactive to global financial conditions. This suggests that redemption pressures by funds' ultimate investors play an important role in mutual fund investment strategies. News reports around the January–February 2014 volatility episode are in line with this interpretation (*Financial Times,* 2014b).
- Global funds are more stable sources of capital flows.[21] The evidence suggests that this may be because they

[20]The differences across various types of mutual funds highlighted here are statistically significant. The results are generally robust when subsamples (before and after the global financial crisis) are used; when multiple fund characteristics are examined at the same time; and when alternative global factors (such as the TED spread and the volatility of the U.S. federal funds futures rate) are used.

[21]This is contrary to the perception that crossover funds (those not dedicated to emerging market assets but that opportunistically invest in them) are more return sensitive and volatile. The average share of

Figure 2.11. Drivers of Global and Dedicated Funds' Flows into Emerging Markets around the Global Financial Crisis



Sources: EPFR Global; and IMF staff calculations.
Note: EM = emerging market.

also face smaller redemption pressures from their ultimate investors during periods of distress (Figure 2.11).

- Investor behavior differs by regions. Flows of funds domiciled in the United Kingdom and the United States are less sensitive to the VIX than those of other European funds and offshore funds. These variations may reflect the fact that movements in the VIX are more directly related to economic conditions in the United Kingdom and the United States, where investors may have an incentive to diversify away from their countries when faced with bad news at home. Moreover, Figure 2.1, panel 2, also suggests distinctive cyclical behavior of Japanese funds.[22]
- Small funds are more cyclical with respect to global financial conditions both for bond and equity flows.[23]

Although various factors are working in opposite directions, the overall composition of mutual funds is likely to become more reactive to global financial conditions. Most important, the share of bond funds, which are more sensitive to global financial shocks, is rising. Moreover, the proportion of open-end funds that are subject to redemptions is growing as well.[24] However, in fixed income and equity markets, more flows are now coming from more stable global funds. The declining share of offshore-domiciled funds has also contributed to more stability.

Local Financial Systems and Asset Prices

Has the deepening of the financial sector in emerging markets lowered the sensitivity of emerging market asset prices to external financial conditions? As discussed in Box 2.2, the theoretical relationship between financial deepening and exposure to global financial conditions is not clear-cut, and therefore determining it requires empirical investigation. To that end, we examined yields and returns of foreign and local currency bonds, equities, and currencies. The study covered various dimensions of financial deepening, including foreign participation in local currency markets and institutional quality.

Financial deepening does help mitigate the impact of global financial shocks on domestic asset prices. A panel regression model is estimated relating country-level excess stock market returns, local currency sovereign bond yields, foreign currency sovereign bond spreads, and currency excess returns to various global and domestic factors.[25] As in the case of the analysis of

emerging market assets is small for global funds (though rising—Figure 2.5, panel 4), but the size of these funds tends to be much larger. Therefore, small changes in their allocation can potentially cause large absolute swings in their emerging market investments.

[22]The coverage of Japanese investment trusts in the EPFR Global database is more limited compared with that of mutual funds in Europe and the United States.

[23]This is in line with theoretical predictions in Corsetti and others (2004).

[24]The compositional changes are based on the EPFR Global database and may not be fully representative of the mutual fund universe.

[25]See Jaramillo and Weber (2013) for a recent analysis of global factors in domestic bond markets in emerging market economies.

Table 2.2. Role of Financial Deepening in Dampening the Impact of Global Financial Shocks on Asset Prices
(Estimated coefficients on the interaction terms of the VIX and respective financial development measure)

	Equity Excess Returns		Foreign Currency Sovereign Bond Spreads		Local Currency Sovereign Bond Yields		Currency Excess Returns	
	Expected Sign	Estimate	Expected Sign	Estimate	Expected Sign	Estimate	Expected Sign	Estimate
Financial Depth								
Bank Assets	+	0.001**	–	–0.001***	–	–0.002***	+	0.001**
Nonbank Financial Institution Assets	+	0.001***	–	–0.000	–	–0.001***	+	0.019*
Domestic Bonds	+	0.000	–	–0.001	–	–0.002***	+	–0.001**
Stock Market Capitalization	+	0.001**	–	–0.001***	–	–0.001***	+	0.001***
Investor Base								
Mutual Fund Assets	+	0.003**	–	0.000	–	–0.003**	+	0.000
Insurance Company Assets	+	0.005***	–	–0.004***	–	–0.005***	+	0.002
Pension Fund Assets	+	0.004***	–	–0.001***	–	–0.001***	+	0.003**
Market Liquidity								
Stock Market Total Value Traded	+	0.001***	–	–0.001***	–	–0.002***	+	0.001**
Bond Bid-Ask Spreads	–	–0.463	+	0.614***	+	0.467***	–	–0.559
Debt Structure								
Original Sin Index	nil	–0.050	+	0.268***	+	0.159***	–	–0.118
Foreign Holdings of Sovereign Debt	–	–0.233***	+	0.098*	+	0.209***	–	–0.232**
Foreign Share in LC Sovereign Debt	–	–0.447*	+	–0.100	+	0.202***	–	–0.644
Institutional Quality								
Rule of Law	+	0.044**	–	–0.083***	–	–0.088***	+	0.011
Accounting Standards	+	0.077***	–	–0.036***	–	–0.125***	+	0.066**
Transparency of Government Policy	+	0.122***	–	–0.054	–	–0.150***	+	0.077

Source: IMF staff estimates.

Note: LC = local currency; TED = Treasuries and Eurodollar; VIX = Chicago Board Options Exchange Volatility Index. Equity returns are on a dollar basis, and local currency sovereign bond yields are without hedging. Each model is estimated using country fixed effects; global factors as controls (including the TED spread, credit spread, term spread, and global market returns); country-specific factors (including dividend yield differentials, interest differentials, currency returns, exchange rate regimes, sovereign credit rating, and the forecasts of GDP growth, inflation, and the current account balance, depending on asset types); a global risk factor (a measure of foreign exchange risk for currency excess returns and the VIX for all others); and the global risk factor's interaction with one measure of financial deepening, debt structure, or institutional quality at a time. Estimation periods are May 1995–August 2013 for equities; May 1995–August 2013 for foreign currency sovereign bonds; January 2001–August 2013 for local currency bonds; and May 1995–August 2013 for currencies. Results are robust to other measures of financial deepening (including bank private credit, nonbank private credit, stock market turnover, and bond value traded) and institutions (quality of government regulation, control of corruption, government effectiveness, and political stability, among others). See Annex 2.1 for details, Table 2.4 for sample economies, and Table 2.5 for definitions of variables. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

portfolio flows, the focus is on differences in the reaction to global financial conditions, here depending on the degree of financial sector deepening. In our study, most of the dimensions of financial deepening are associated with a lower sensitivity to global shocks for equity markets as well as for markets of bonds denominated in foreign or local currencies; the results for the exchange rate market are somewhat weaker (Table 2.2).[26]

Having a larger local investor base has a stabilizing effect. A larger financial sector (banks and nonbanks such as mutual funds, pension funds, and insurance companies) significantly helps limit the effects of global financial shocks. Moreover, these effects are quantitatively large (Figure 2.12). Some of the effects of a larger local investor base are sufficient to offset the unfavorable direct impact from the increase in the VIX. These results are consistent with the literature stressing the countercyclical nature of capital flows of domestic investors (see Broner and others, 2013; and IMF, 2013c).[27]

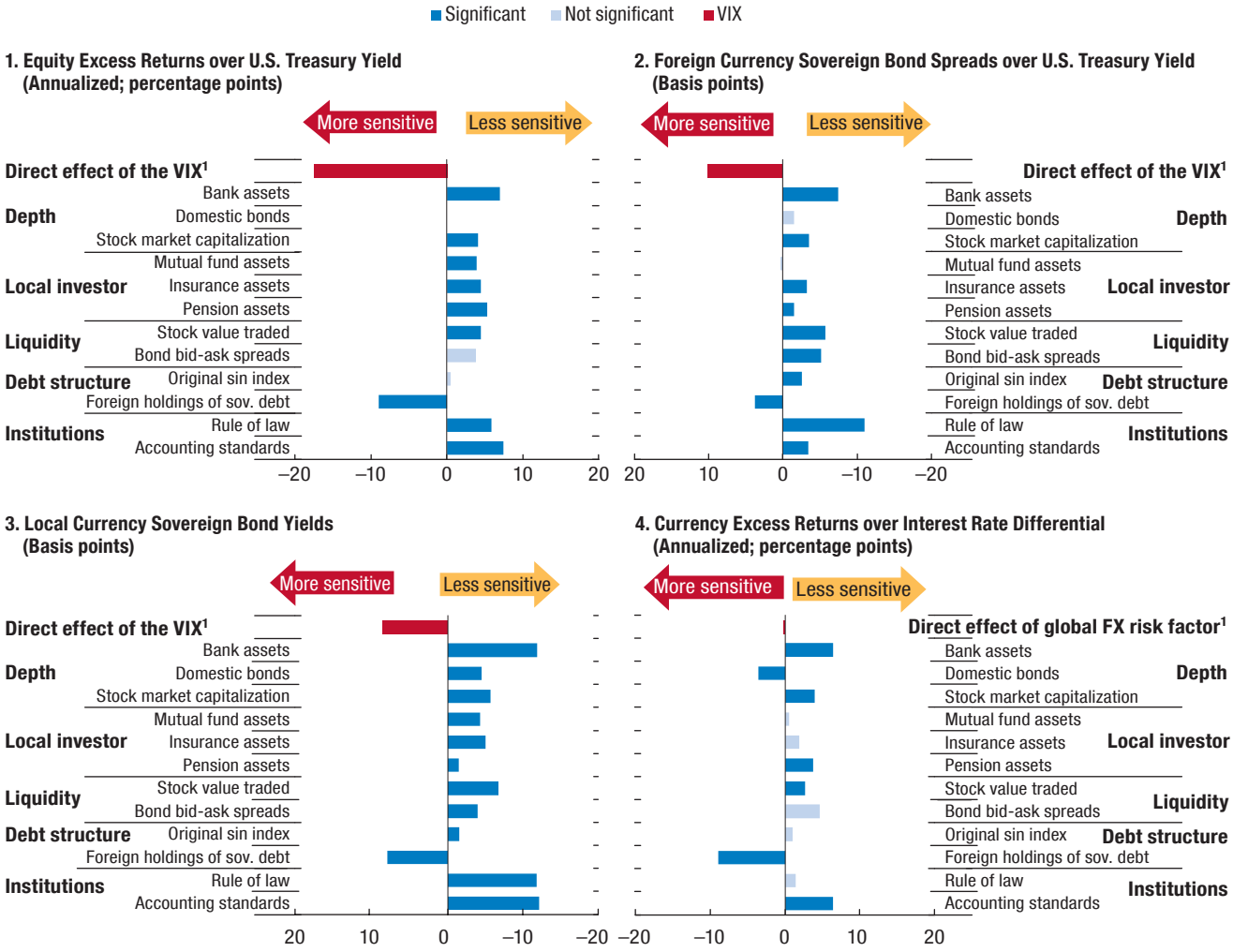
Similarly, capital market development generally lowers the sensitivity of asset returns to global financial conditions. A higher stock market capitalization contributes to the stability of bond, equity, and currency markets. Large and liquid stock markets also mitigate the sensitivity of equity returns to global financial conditions. Similarly, bond markets with higher liquidity (that is, with lower bond bid-ask spreads) are less reactive to VIX shocks.

Therefore, the recent decline in liquidity in some emerging markets appears to have contributed to making local bond yields more sensitive to the VIX in these markets (Figure 2.13). Market participants attribute this to reduced market making by global banks operating in emerging markets. This could be partly due to tighter

[26]These results are generally robust when the estimation sample is separated into the periods before and after the global financial crisis.

[27]A robustness check showed little evidence of nonlinear effects (when returns are large or small and when they are negative or positive).

Figure 2.12. The Effects of Financial Deepening on the Sensitivities of Asset Returns to Global Risk Factor
(Estimated coefficients on the interaction terms of the VIX and one financial deepening variable × best 75th – worst 25th percentile of the financial deepening variable × 10 percentage point change in the VIX)



Source: IMF staff estimates.
Note: VIX = Chicago Board Options Exchange Market Volatility Index. FX = foreign exchange. With the estimation results presented in Table 2.2, the panels illustrate how much a country can mitigate the negative effect of a 10 percentage point increase in the VIX (or FX risk factor for currency excess returns) by having more developed (deeper) domestic financial systems or better institutions. For example, the effect of a 10 percentage point shock to the VIX on stock prices for economies with the largest 75th percentile ratio of stock market capitalization to GDP is 4 percentage points smaller than those with the lowest 25th percentile ratio of market capitalization to GDP (panel 1, stock market capitalization bar). Percentile data are taken from the whole country-month sample from 2005 to 2013 (some variables, such as insurance and pension fund assets, start for most of the countries only around 2003–05). For bond bid-ask spreads and original sin index, the "best" 75 percent means those with lowest 25th percentile values. See Table 2.4 for sample economies and Table 2.5 for definitions of variables.
[1]The direct effect of the VIX or FX risk factor for currency excess returns (red bar) is the average effect of a 10 percentage point increase of the VIX or FX risk factor, without controlling for the level of financial deepening or institutional quality.

regulation set by supervisors in their home countries and also to changes in bank business models following the global financial crisis.[28] Market participants believe that local banks have helped fill this liquidity gap somewhat, but not fully. Expanding local institutional investors can create demand in primary markets but do not necessarily help improve secondary market liquidity, as they tend to buy and hold.

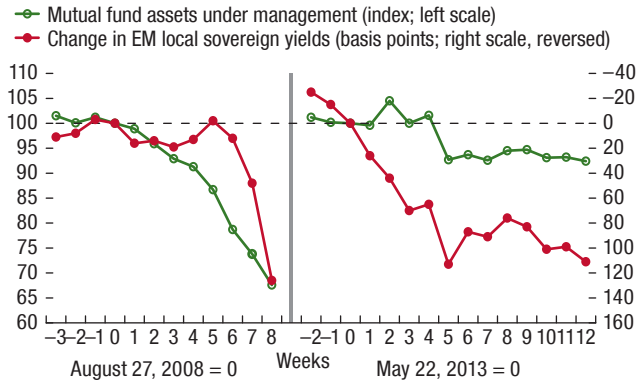
Overcoming "original sin" has reduced the sensitivity to global factors of both foreign and domestic currency bond prices. In principle, reducing the share of foreign currency debt in total external debt lessens issuers' credit risk, thereby reducing the price sensitivity to VIX shocks.

[28]See Chapter 1 of the October 2013 GFSR for details.

Figure 2.13. Sensitivity of Local Yields to Portfolio Flows and Decline in Global Market Making

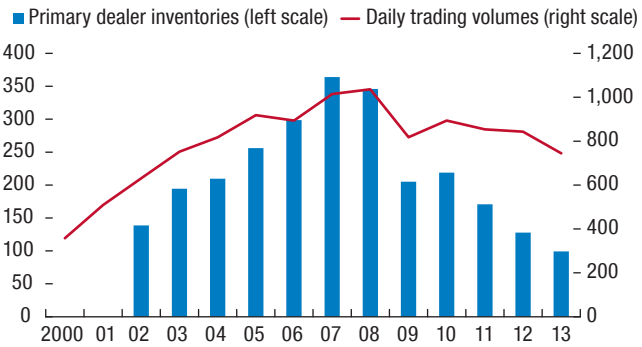
Local market yields seem to have become more sensitive to global financial shocks…

1. May 2013 Sell-Off of Emerging Market Bonds versus the Lehman Brothers Episode



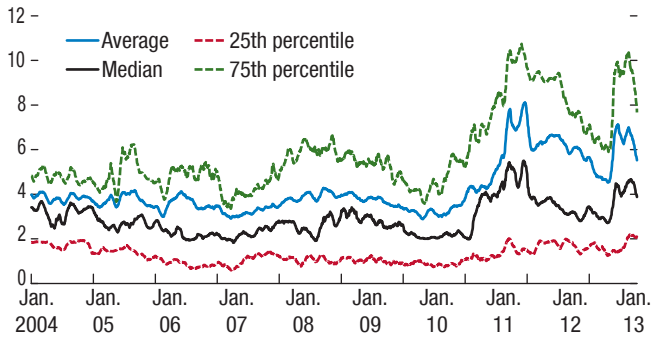
…in the context of reduced market making by global banks and brokers…

2. Nongovernment Bond Inventories and Trading Volumes[1] (Billions of U.S. dollars)

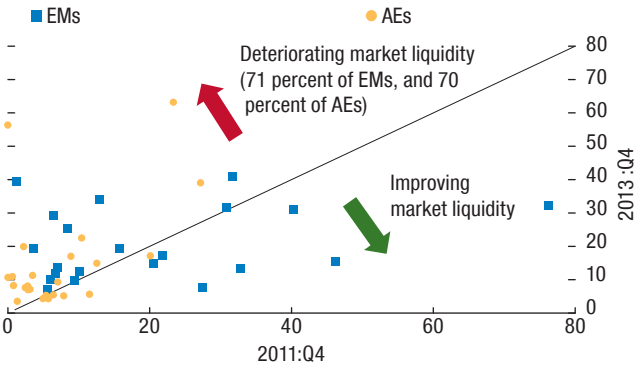


… and liquidity in local government bond market has declined recently in some economies.

3. Bid-Ask Spreads for Government Bonds in Selected Economies[2] (Spreads for local 10-year government bond yields; basis points)



4. Bond Market Illiquidity (Quarterly average bid-ask spreads; basis points)



Sources: Bloomberg, L.P.; Elkins-McSherry; EPFR Global; Federal Reserve; J.P. Morgan; Securities Industry and Financial Markets Association; and IMF staff calculations.
Note: AE = advanced economy; EM = emerging market.
[1]Average daily volumes include municipal securities, treasuries, asset- and mortgage-backed securities, corporate debt, and federal agency securities.
[2]Sample includes Bulgaria, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Korea, Lithuania, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Romania, Russia, South Africa, Taiwan Province of China, Thailand, Turkey, and Ukraine.

At the same time, a larger foreign engagement in domestic markets increases the price sensitivity to global financial shocks. When more government debt (domestic and external) is held by foreigners, excess equity returns, local currency bond yields, and currency excess returns become more sensitive to global financial conditions. This effect is particularly strong for local currency bond yields.

Improving local institutions and governance related to financial system infrastructure strongly reduces the exposure of equity and bonds to fluctuations in global financial markets. Indeed, improved governance—measured as the prevalence of the rule of law, the strength of auditing and reporting standards, and the transparency of government policymaking—often has a larger impact than indicators of financial deepening.[29]

[29]This is in line with the literature emphasizing the role of transparency in dampening volatility, including Brandão-Marques, Gelos, and Melgar (2013).

Table 2.3. Summary of Methods and Results

Approach	Asset Prices	Portfolio Flows
Rolling beta	Fig. 2.6. EM assets are increasingly integrated with global markets, with rising beta vis-à-vis global markets.	n.a.
Herding among global mutual funds (fund-level analysis)	n.a.	Fig. 2.7. Particularly for equity funds, herding is on the rise over time.
Differences across broad investor groups: sensitivity to global financial shocks and momentum trading	n.a.	Fig. 2.8. Bond investors (increasing in importance) are more sensitive to global financial shocks than equity investors. Mutual funds react more to changes in global conditions than institutional investors, and follow procyclical momentum strategies.
Institutional investors and mutual funds during distress periods	n.a.	Fig. 2.9. Institutional investors withdrew more from EM bonds during the global financial crisis and sovereign downgrades to below investment grade.
Differences across types of mutual funds in their sensitivity to global financial shocks (fund-level analysis)	n.a.	Fig. 2.10. Actively managed open-end bond funds and smaller funds are more sensitive to global financial shocks. Crossover investors (increasing in importance) are less sensitive to global financial shocks. Funds from different domiciles behave differently (see also Fig. 2.1).
Local financial systems and sensitivity to global financial shocks	Table 2.2, Fig. 2.12. Deeper local investor bases and capital markets, higher liquidity, and better institutions reduce the sensitivity to global financial shocks. Reducing "original sin" is beneficial but higher foreign ownership of local bonds increases the sensitivity to global financial shocks.	n.a.
Role of local macroeconomic factors during distress episodes over time	Box 2.4. Over time, the role of macroeconomic factors in explaining cross-country patterns of contagion during distress episodes has not increased.	n.a.
Local macroeconomic factors and sensitivity to global financial shocks	Annex 2.1. Better macroeconomic conditions can reduce local currency bond sensitivity to global factors. International reserves and low external public debt are important.	Annex 2.1. Higher external public debt increases the sensitivity of equity flows to global factors.

Source: IMF staff.
Note: EM = emerging market.

Summary

This section examined the relationship between the investor base, local financial systems, portfolio flows, and local asset prices using a variety of approaches. Table 2.3 summarizes the methods used in this section and the key messages from each line of analysis.

Policy Implications and Conclusions

The results presented in this chapter can help guide emerging markets in maximizing the net benefits of further integration with global capital markets. Our analysis has identified the types of investors that tend to amplify the impact of global financial conditions and the aspects of financial deepening that help absorb the effects of global financial shocks. The changing mix of global portfolio investors is likely to make overall portfolio flows more sensitive to global financial shocks. The share of less stable bond flows is rising. Growing investment from more stable institutional investors than mutual funds is welcome, but they can pull back more strongly and persistently when facing a large shock. Moreover, herding behavior among international mutual funds continues, and investors do not seem to be differentiating among emerging markets based on macro fundamentals during crises moreso than in the past. Nonetheless, the progress made by emerging markets toward financial deepening and improving institutions reduces their financial asset price sensitivity to global financial shocks. Yet, large foreign participation in local markets can introduce instability. These findings have several policy implications.

Governments can promote specific forms of financial deepening to enhance resilience to global financial shocks. In particular, developing a local investor base (both of banks and nonbanks) and improving institutional quality help dampen external financial shocks.

Similarly, the evidence on the beneficial role of local currency bond markets generally lends support to government-led initiatives to develop these markets, but caution is warranted. Initiatives such as the Asian Bond Markets Initiative and the G20 action plan provide guidance on how to develop these markets. Although foreign investors can play a critical role in financial deepening in emerging markets, a very high level of foreign participation has drawbacks. Therefore, this type of participation needs to be monitored closely and accompanied by a deepening of the local investor

base, by adequate macroeconomic policies, and by better institutions.

Knowing the investor base and its characteristics is critical when assessing the risks of capital flow reversals and designing macroprudential policies.

- Large institutional investors provide relatively stable flows but can react more strongly than others to downgrades of sovereign debt to below investment grade. Hence, maintaining a solid sovereign rating and remaining included in global indices is essential.
- The inclination of retail investors (mutual funds) to follow momentum trading and to react to international shocks requires close monitoring of their positions. Even in markets dominated by institutional investors, volatile retail investors can affect asset prices significantly.
- Our regression results show that investor behavior can vary according to the region in which they are domiciled, perhaps due to differences in the specific factors that are relevant for them. Therefore, attracting a geographically diverse investor base can help smooth flows. This can be achieved, for example, by targeting asset managers in different parts of the world.
- Close monitoring of cross-border activities of open-end mutual funds is warranted.

The continued instability of portfolio flows to emerging markets highlights the importance of insurance mechanisms. Since emerging markets remain exposed to the ups and downs of international capital markets, counting on insurance through access to bilateral and multilateral credit lines or adequate international reserves remains important for many of them.

The global regulatory reform agenda is helping to improve financial stability, but it needs to pay attention to potential unintended consequences for market-making activities. Market liquidity in bond markets has declined in emerging market economies in the past couple of years, in tandem with a drop in inventories maintained by global banks. While the exact causality is hard to establish, market participants argue that various regulations restricting bank trading activities may have contributed to this decline in market making. Lower market liquidity increases the volatility of emerging market bond prices and makes them more exposed to changes in global financial conditions.

The information gap surrounding institutional investors needs to be filled. Although institutional investors, such as sovereign wealth funds and international reserve managers, are large players in emerging markets, there is insufficient information available about their asset allocation and investment patterns. As a result, the analysis of capital flows tends to focus on areas where data are available, such as mutual fund investments.

Annex 2.1. Data, Main Empirical Framework, and Additional Analyses

This annex describes the data sources, contains technical background, and provides key results from the empirical analysis in this chapter.

Data

Portfolio Allocation and Investment Flows for Mutual Funds

Mutual fund data are from Emerging Portfolio Fund Research (EPFR Global), which covers portfolio allocations and flows by country and type of asset for about 11,000 equity funds and about 4,500 fixed-income funds, all of which had $22 trillion in total assets as of the end of 2013. According to EPFR Global, its data track more than 95 percent of emerging-market-focused bond and equity funds. The investment in emerging markets covered by EPFR Global to total U.S. investment (using the U.S. Treasury International Capital System) is 58 percent for equities and 38 percent for debt securities as of 2012.

Mutual funds are sold mainly to retail investors, but institutional investors have been purchasing an increasing number of mutual fund shares. "EPFR institutional" investors are identified as funds targeting institutional investors or those with investments of $100,000 or more. The share of EPFR institutional investors has risen over time to about 50 percent in 2013 in our sample.

EPFR Global estimates aggregate portfolio flows from funds at the country level by multiplying aggregate flows from investors to funds and the average country allocation by fund type. We estimated portfolio flows from each fund to each country using the change in assets under management (AUM) adjusted for valuation effects, approximated by country index returns as in Gelos and Wei (2005) and Raddatz and Schmukler (2012).

Portfolio Investment Flows for Institutional Investors

Portfolio flows data for institutional investors are collected by Bank of New York Mellon (BNY) in its role as a custodian for many large global institutional inves-

tors domiciled in many jurisdictions throughout the world. These include pension funds, insurance companies, and some official reserve funds from various countries, among others. The data consist of net daily flows, aggregated by country, for equities, sovereign bonds, and corporate bonds.

Portfolio Investment Flows for Hedge Funds

Hedge funds data are taken from two sources. The Hedge Fund Research (HFR) database comprises more than 4,500 funds and funds of funds with AUM of $1.3 trillion, of which about 500 (with AUM of $80 billion) report that their investment focus is in emerging markets. The data cover about half of the industry by assets (data from BarclayHedge).[30] The second source is the Eurekahedge Emerging Markets Hedge Fund database, which covers emerging-market-dedicated hedge funds only and comprises about 1,000 hedge funds with AUM of $160 billion.

We estimate portfolio flow data of hedge funds based on the AUM of funds, adjusted for the funds' returns to account for valuation effects. This proxy may not be accurate for funds with strongly varying cash holdings. But their cash positions usually do not fluctuate much, except during severe stress periods.

Empirical Framework

All models in the chapter are estimated using monthly data. Table 2.4 provides the country samples, and Table 2.5 summarizes the definitions and data sources of variables used in the various estimations.

Bond versus Equity Flows and Institutional versus Mutual Fund Flows

Figure 2.8 highlights the differences between equity and bond investors and between institutional investors and mutual funds based on an estimation of the following panel model for each type of flows, using EPFR Global and BNY data:

$$Flow_{i,t} = \alpha_i + \beta Global_t + \gamma Rindex_{i,t-1} + \sum_{p=1}^{P} \delta_p Control_{p,i,t} + \varepsilon_{i,t}, \quad (2.1)$$

where $Flow_{i,t}$ is monthly net bond or equity inflows to country i. The model includes country-level fixed effects α_i. The explanatory variables include one global factor, $Global_t$ (from the Chicago Board Options Exchange Market Volatility Index, VIX; the Merrill Lynch Option Volatility Estimate, MOVE index; the volatility of two-year interest rate futures; and the Treasuries and Eurodollar, TED, spread). $Rindex_{i,t-1}$ is the lagged relevant country index return (orthogonalized using the VIX) and is added to examine momentum behavior. $Control_{p,i,t}$ are country-specific controls (there are P number of such controls), which include the first difference of the composite risk score of the *International Country Risk Guide* (ICRG) and the lagged real interest rate differential against the United States. $\varepsilon_{i,t}$ is the residual. The coefficient vectors to be estimated are β, γ, and δ.

Mutual Fund Characteristics and Their Flows' Sensitivity to Global Financial Shocks

The portfolio flows' sensitivities to global financial shocks by type of funds (Figure 2.10) are examined by expanding the baseline model (2.1) to use fund-level data and to include one interaction term between a fund characteristic dummy and a global factor, as follows:

$$Flow_{i,j,t} = \alpha_{i,j} + \beta_1 Global_t + \beta_2 Chara_{j,t} \times Global_t + \beta_3 Chara_{j,t} + \gamma Rindex_{i,t-1} + \sum_{p=1}^{P} \delta_p Control_{p,i,t} + \varepsilon_{i,j,t}, \quad (2.2)$$

where $Flow_{i,j,t}$ is the monthly net inflows to country i by fund j, divided by each fund's assets allocated to the country at month t. The model includes country-fund fixed effects $\alpha_{i,j}$. $Chara_{j,t}$ are dummy variables indicating fund characteristics.[31] The variables are de-meaned so that β_1 shows the average effect of the global factor across funds. The results presented in Figure 2.10 are robust to various specification changes.[32]

Financial Development and Asset Returns' Sensitivity to Global Factors

The effect of financial development on the sensitivity of asset prices to global financial conditions is estimated

[30]Data are available at www.barclayhedge.com/research/indices/ghs/mum/HF_Money_Under_Management.html.

[31]The fund characteristic dummy is generally time invariant and perfectly colinear with fund-level fixed effects. An exception is fund size: large and small funds are defined as those above the 80th and below the 20th percentiles of AUM, respectively.

[32]As a robustness check, we estimate the model with interaction terms between multiple characteristic variables, and the VIX. Most results are robust, but the sign of the coefficient of closed-end funds changes.

Table 2.4. Sample Economies

		Herding Measure		Flow Regression						Asset Price Regression				Stress Episode Regression[1]					
				EPFR Global Data															
				Fund-Level		Country-Level		BNY Data											
	Background	Bond	Equity	Bond	Equity	Bond	Equity	Bond	Equity	Equity Excess Return	FC Gov. Bond Spreads	LC Gov. Bond Yields	Currency Excess Returns	Thailand	Russia	Brazil	GFC	Europe	Tapering
Argentina	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Bangladesh	x		x																
Brazil	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Bulgaria	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x
Chile	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
China	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Colombia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Croatia	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x
Czech Republic	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x
Egypt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Hungary	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
India	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Indonesia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Israel	x		x		x	x	x	x	x	x			x	x	x	x	x	x	x
Jordan	x	x	x							x			x	x	x	x	x	x	x
Korea	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Latvia	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x
Lebanon														x	x	x	x	x	x
Lithuania	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x
Malaysia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mexico	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Morocco	x	x	x							x			x	x	x	x	x	x	x
Nigeria	x	x	x							x	x		x	x	x	x	x	x	x
Pakistan	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x
Peru	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Philippines	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Poland	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Romania	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x
Russia	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
Serbia	x	x	x	x	x	x	x			x	x		x						
South Africa	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sri Lanka	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x
Taiwan Province of China	x		x																
Thailand	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x
Turkey	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x
Ukraine	x	x	x							x	x		x	x	x	x	x	x	x
Uruguay	x	x																	
Vietnam	x	x	x	x	x	x	x			x	x		x	x	x	x	x	x	x

Note: BNY = Bank of New York Mellon; FC = foreign currency; GFC = global financial crisis; gov. = government; LC = local currency.

[1]The table shows for each stress episode the largest sample used in the regressions for exchange rates, exchange market pressure index, and equity and bond prices. Specific regressions may have fewer observations due to data availability. Bond price regressions during the Thai, Russian, and Brazilian crises also include Greece.

Table 2.5. Definition of Variables Used in Estimations

Variable	Description	Source
Dependent variables		
Equity excess returns	MSCI equity monthly returns (in U.S. domestic) in excess of the U.S. short-term rate (one-month Eurodollar deposit rate)	Thomson Reuters Datastream
FX sovereign bond spreads	EMBI Global stripped spreads	Thomson Reuters Datastream
LC sovereign bond yields	J.P. Morgan Global Bond Broad Index redemption yields	Thomson Reuters Datastream
Currency excess returns	Monthly exchange rate excess returns on the carry	Thomson Reuters Datastream
Exchange market pressure index	Sum of exchange rate depreciation and reserve outflows (scaled by base money)	Thomson Reuters Datastream, Haver Analytics, IFS, CA
Institutional investor flows	Monthly net portfolio inflows by country and by asset (bond and equity), normalized by recipient economy GDP	BNY, WEO
Mutual funds flows	Monthly net portfolio inflows by country, by fund, and by asset (bond and equity), normalized by fund's AUM. We use both country-level and fund-level data.	EPFR Global
Global factors		
S&P 500 excess returns	S&P 500 monthly returns in excess of the U.S. short-term interest rate	Thomson Reuters Datastream
HY spread	Difference between Moody's yield on seasoned corporate bonds—all industries with BAA rating and the one-month Eurodollar deposit rate	FRB
Term spread	Market yield on U.S. Treasury securities at 10-year constant maturity minus the three-month Treasury bill secondary market rate	FRB
TED spread	Three-month Eurodollar deposit rate minus the three-month Treasury bill rate	FRB
Credit spread	Difference between Moody's yield on seasoned corporate bonds—all industries with AAA rating—and yield of those with BAA rating	FRB
VIX	Chicago Board Options Exchange Market Volatility Index	Thomson Reuters Datastream
FX risk	Monthly average of daily implicit volatilities of continuous call options on euro-dollar, pound sterling–dollar, yen-dollar, and Swiss franc–dollar exchange rates	Thomson Reuters Datastream
Local financial deepening, debt structure, and institutional quality		
Bank assets	Total DMB assets in percent of GDP	World Bank
NBFI assets	Total NBFI assets in percent of GDP	World Bank
Domestic debt	Total outstanding domestic public debt in percent of GDP	World Bank
Stock market capitalization	Total value of all listed shares in a stock market in percent of GDP	World Bank
Stock value traded	Total value of all traded shares in a stock exchange in percent of GDP	World Bank
Bond bid-ask spreads	Monthly average of bid-ask spread in local bond markets	Bloomberg, L.P.
Mutual fund assets	Mutual funds' assets in percent of GDP	World Bank
Insurance assets	Insurance companies' assets in percent of GDP	World Bank
Pension assets	Pension funds' assets in percent of GDP	World Bank
Original sin index	Max. (1–international debt issued in currency of country i divided by international debt issued by country i, 0), following Eichengreen, Hausmann, and Panizza (2005)	BIS
Foreign sovereign holdings	Total public debt (domestic and external) owned by nonresidents	Arslanalp and Tsuda (2014)
Foreign share in LC debt	Domestic local currency public debt owned by nonresidents	J.P. Morgan, ADB, CA
FX external public debt	Total external public debt denominated in dollars, euros, yen, pounds sterling, Swiss francs, or SDRs in percent of GDP	World Bank
Reserves	Official international reserves in percent of the money base	IFS, Haver Analytics
Rule of law	Perception of confidence and adherence to rules of society and laws, according to World Governance Indicators	World Bank
Accounting standards	Strength of auditing and reporting standards, 1–7 (best)	World Economic Forum
Transparency of government	Transparency of government policymaking, 1–7 (best)	World Economic Forum
Local factors		
Dividend yield differential	Difference between the dollar dividend yield implicit to each country's MSCI index and that of the world MSCI index	Thomson Reuters Datastream
Currency returns	Monthly exchange rate logarithmic return	Thomson Reuters Datastream
Interest rate differential	Local short-term interest rate (one month or closest available maturity) in excess of the U.S. short-term interest rate (one-month Eurodollar deposit rate)	Thomson Reuters Datastream
ICRG country risk rating	Index of 22 variables covering political, financial, and economic risks	ICRG
Real interest rate differential	Interest rate differential minus expected inflation differential (from *Consensus Forecasts*)	Thomson Reuters Datastream and *Consensus Forecasts*
GDP growth forecast	Consensus one-year-ahead mean forecast for GDP growth	*Consensus Forecasts*
Inflation forecast	Consensus one-year-ahead mean forecast for consumer price index inflation	*Consensus Forecasts*
Current account forecast	Consensus one-year-ahead mean forecast for the current account as a fraction of forecasted GDP	*Consensus Forecasts*, EIU, IFS, Haver Analytics
Sovereign credit rating	Standard & Poor's foreign currency long-term sovereign debt rating (AAA = 24, SD = 1)	Bloomberg, L.P.
Exchange rate regime	Dummy that takes value 1 for floating exchange rates and zero otherwise	AREAER
Inflation	Average over last four quarters of year-over-year inflation rate consumer prices	IFS, CA
Current account to GDP	Current-account-to-GDP ratio	WEO
Trade linkage with crisis source	Exports to crisis country/total exports. Crisis country is the United States for the global financial crisis and tapering announcement; and to euro area for the European crisis.	Direction of Trade Statistics Database
Financial openness	Foreign assets plus foreign liabilities to GDP ratio	Lane and Milesi-Ferreti (2007, updated)
Returns of LC bonds	Monthly returns of GBI-EM index (in U.S. dollars) in excess of the U.S. short-term rate (one-month Eurodollar deposit rate)	Thomson Reuters Datastream
Returns for other bonds	Monthly returns of EMBI Global index (in U.S. dollars) in excess of the U.S. short-term rate (one-month Eurodollar deposit rate)	Thomson Reuters Datastream
Returns of equities	Monthly returns of MSCI index (in U.S. dollars) in excess of the U.S. short-term rate (one-month Eurodollar deposit rate)	Thomson Reuters Datastream

Note: ADB = Asian Development Bank; AREAER = *Annual Report on Exchange Arrangements and Exchange Restrictions;* AUM = assets under management; BIS = Bank for International Settlements; BNY = Bank of New York Mellon; CA = country authorities; DMB = deposit monetary banks; EIU = Economist Intelligence Unit; EM = emerging markets; FI = financial institution; FRB = Board of Governors of the Federal Reserve System; FX = foreign exchange; HY = high yield; ICRG = *International Country Risk Guide;* IFS = *International Financial Statistics;* LC = local currency; NB = nonbank; SDRs = special drawing rights; WEO = *World Economic Outlook.*

with the following panel regressions. The dependent variable $r_{i,t}$ is either the standard country MSCI equity monthly log return in excess of the one-month U.S. Eurodollar rate, the EMBI Global Bond Index stripped spread, the J.P. Morgan Global Bond Broad Index redemption yield, or the foreign exchange monthly log return in excess of the interest rate differential.

$$r_{i,t} = \alpha_i + \beta_1 Global_t + \beta_2 FinDev_{i,t-1} \times Global_t + \beta_3 FinDev_{i,t-1} + \sum_{k=1}^{K} \delta_{1k} Global\ Control_{k,t} + \sum_{p=1}^{P} \delta_{2p} Local\ Control_{p,i,t} + \varepsilon_{it}. \quad (2.3)$$

- Coefficients for a global risk factor ($Global_t$) and their interaction with a lagged financial deepening variable ($FinDev_{i,t-1}$) show whether financial deepening improves the resilience to global financial shocks. The global risk factor is the VIX for the equity and bond regressions and a foreign-exchange-specific risk factor for the currency return regressions.[33]
- Furthermore, the specification controls for K number of other global financial factors ($Global\ Control_{k,t}$), such as a global market portfolio return (the S&P 500 total return for equities and the high-yield spread for bonds), the TED spread, the credit spread, and the term spread (also interacted with a dummy that signals proximity of U.S. monetary policy rates to the zero lower bound).
- The model also controls for P number of local market and macroeconomic conditions ($Local\ Control_{p,i,t}$) using the one-year-ahead *Consensus Forecasts* for GDP growth, consumer price index inflation, and the balance of the current account; the differential dividend yield (equity only) and short-term interest rates; simple exchange rate returns; the sovereign bond credit rating (bonds only); and a dummy variable for the exchange rate regime (currency excess returns only).[34]
- The main results presented in Table 2.3 and Figure 2.13 do not change when the global risk factor is interacted with each financial development variable as well as with real GDP per capita, local market liquidity, crisis dummies, or various measures of capital account openness (both de facto and de jure).

[33]According to Ranaldo and Söderlind (2010), a foreign exchange risk measure is more informative for currency returns than broader risk measures such as the VIX.

Additional Analyses

Local Macroeconomic Factors and the Sensitivity of Flows and Returns to Global Factors

Compared with global factors, local macroeconomic factors generally play more ambiguous roles for flows and asset prices (Table 2.6). The forecasts of GDP growth, inflation, and the current account are often not statistically significant.[35] Some results are worth mentioning:

[34]The choice of global and local controls follows the literature on the predictability of equity returns (Campbell and Hamao, 1992) and bond spreads (see González-Rozada and Levy Yeyati, 2008). All local conditions and financial development variables are lagged by one month and one year, respectively, to dispel endogeneity concerns.

[35]The literature is mixed regarding the relative roles of push and pull factors (see, for instance, Ghosh and others, 2012, for a survey).

Table 2.6. Local Macroeconomic Factors and Global Financial Shocks—The Effect on Asset Prices and Portfolio Flows
(Estimated coefficients on the interaction terms of the VIX and local macroeconomic variables)

	Equity Excess Returns		FC Bond Spreads		LC Bond Yields		Currency Excess Returns		Bond Country Flows		Equity Country Flows	
	Exp. Sign	Estimate	Exp. Sign	Estimate	Exp. Sign	Estimate	Exp. Sign	Estimate	Exp. Sign	Estimate	Exp. Sign	Estimate
FC External Public Debt	nil	0.001	+	0.007***	+	0.010***	–	0.002	–	–0.012	–	–0.011***
Current Account Surplus	+	0.007**	–	–0.001	–	0.002*	+	0.000	+	0.014***	+	0.000
Reserves/Monetary Base	+	0.016*	–	–0.015***	–	–0.032***	+	–0.003	+	0.004	+	0.002
GDP Growth	+	–0.011	–	–0.020	–	–0.018***	+	–0.023*	+	–0.001	+	0.001
Inflation	–	0.002	+	0.015***	+	0.020***	–	0.001	–	–0.016**	–	–0.020**

Source: IMF staff estimates.

Note: Exp. = expected; FC = foreign currency; FX = foreign exchange; LC = local currency; VIX = Chicago Board Options Exchange Market Volatility Index. The table presents the estimated coefficients on the interaction of the VIX (FX risk for currency excess returns) with the respective macro variables (all forecast). Each dependent variable is regressed on a set of global and local factors. Asset return models additionally include an interaction of the global risk variable with a linear time trend. Estimation periods are May 1995–August 2013 for equities; May 1995–August 2013 for foreign currency sovereign bonds; January 2001–August 2013 for local currency bonds; May 1995–August 2013 for currencies; November 2003–September 2013 for bond flows; and February 1996–October 2013 for equity flows. Each equation is estimated using country fixed effects and Kraay-Driscoll standard errors. *, **, and *** mean significance at the 10, 5, and 1 percent level, respectively. See Table 2.4 for sample economies and Table 2.5 for the definition of variables.

- Comparing the sensitivity to global conditions, local macroeconomic conditions matter more in bond markets, especially local currency bond yields, than in equity or currency markets. Among the macroeconomic factors, inflation seems to be the only factor that matters consistently for all types of flows and asset returns.
- Larger international reserves reduce the impact of global financial shocks on equity as well as on bond returns. However, they have no significant effect on foreign currency excess returns (even after controlling for the exchange rate regime). Although a direct comparison is difficult, the effect of reserves seems smaller than that of most financial deepening variables.

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Compared with studies that find clearer roles for pull factors, our empirical models are less likely to find such effects, because we cover a more recent period, when emerging markets were more integrated with global markets; and because we control for unobservable slow-moving country-specific factors with country fixed effects.

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