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Do Multi-Sector Bond Funds Pose Risks to Emerging Markets?

by Fabio Cortes and Luca Sanfilippo

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I N T E R N A T I O N A L M O N E T A R Y F U N D

IMF Working Paper

Monetary and Capital Markets Department

Do Multi-Sector Bond Funds Pose Risks to Emerging Markets?

Prepared by Fabio Cortes and Luca Sanfilippo

Authorized for distribution by Anna Ilyina

July 2020

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Abstract

Emerging economies in the post-crisis period increasingly saw portfolio debt inflows from a type of large international investment fund: Multi-Sector Bond Funds (MSBFs). These investors have lacked adequate representation in the literature. This paper constructs a new detailed database from micro-level MSBF emerging market (EM) holdings from 2009:Q4–2018:Q2. Exploiting this data, the paper assesses the risks they pose to the financial stability of specific emerging bond markets. The data shows that MSBFs are highly concentrated—both in their positions and their decision-making. The empirical results further suggest that MSBFs exhibit opportunistic behavior (and more so than other investment funds). In periods of high risk aversion, large MSBF portfolio reallocations out of EMs can be associated with underperformance of the same markets, signaling the importance of monitoring their footprint and better understanding their asset allocation decisions.

JEL Classification Numbers: F32, G11, G15, G23

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Keywords: Investment funds, mutual funds, emerging markets, portfolio debt flows, contagion

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I. INTRODUCTION

The assets under management of regulated investment funds¹ in global capital markets have significantly grown since the Global Financial Crisis.² Within this group, a type of investment fund we coin “Multi-Sector Bond Funds” (MSBFs) has become a growing source of capital for the bond markets of emerging economies.

MSBFs (see Figure 1) are regulated open-end investment funds, meaning investors can buy or redeem outstanding shares at daily frequency, upon demand, and at a price determined by the value of the funds’ net asset value (NAV).³ These funds typically have broad mandates that give fund managers large discretion in making investment decisions, both in terms of geography—in contrast to country/regional dedicated funds—as well as sector exposure.⁴ This usually translates into a portfolio that includes positions in advanced as well as emerging markets. Funds that share at least one or more features with MSBFs are sometimes in the literature referred to as global, international, multi-country, cross-over or broad mandate funds.

Their particular nature has given rise to opportunities for investors and recipient economies alike, but it has also brought about key risks. MSBFs have built up large positions in certain emerging markets (EMs). For feasibility, this paper focuses on 40 large key MSBFs, domiciled across the US and Europe.⁵ The assets of the funds in our sample have more than doubled since the global financial crisis to about \$1 trillion (close to 10 percent of the entire bond investment fund sector globally). Their aggregate emerging market investment in recent years have ranged between \$130–\$160 billion (after peaking over \$170 billion mid-2014) and, unlike most dedicated investors that track emerging market benchmark indices; these funds can have highly concentrated positions, which are currently close to historical highs in a few countries. The sheer

¹ Regulated investment funds, which in the US are referred to as Collective Investment Vehicles (CIVs) and in Europe as Undertakings for Collective Investment in Transferable Securities (UCITS), combine the assets of investors—individual and institutional—and collectively invests those assets in stocks, bonds and/or money market instruments. Accordingly, there are four main types of investment funds: equity, bond, hybrid and money market. While there exist other types that invest primarily in less liquid assets, such as loans and real estate, their assets under management are significantly smaller.

² According to ICI data (2018), global capital markets, as measured by the total value of equity and debt securities outstanding, totaled \$186.3 tn in 2017. The share of total net assets of regulated long-term (equity and bond) funds rose up to 23 percent (\$43.4 tn of the \$186.3 tn) from 16 percent in 2010. Of the \$43.4 tn in investment funds, 24 percent (\$10.4 tn) are bond funds, 50 percent (\$21.8 tn) equity funds and 26 percent (\$11.2 tn) mixed funds. The other 77 percent of global capital markets is accounted for by a range of investors, such as central banks, sovereign wealth funds, pension funds, banks, insurance companies, hedge funds, broker-dealers, and households’ direct holdings of stocks and bonds.

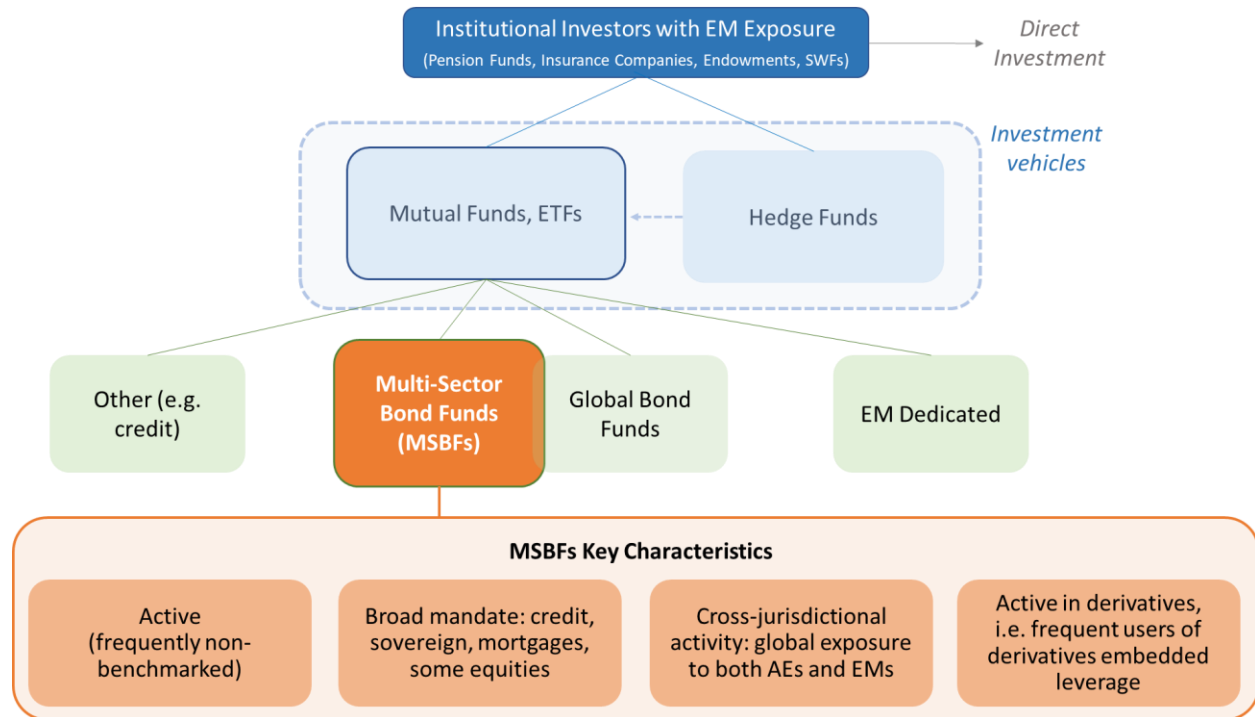
³ There are two main fund structures: open-end and closed-end funds. Open-end funds include traditional investment (or in the US dubbed “mutual”) funds and Exchange-Traded Funds (ETFs). Traditional open-ended investment funds allow investors to buy/sell shares at a price based on the fund’s NAV that is determined at the end of the trading day after the market closes. Like traditional investment funds, ETFs can also create new shares to meet investor demand but these shares trade on exchanges, so they can be bought/sold throughout the day at market-determined prices. In contrast, closed-end funds, issue a fixed number of shares, which are not redeemable from the fund, but traded on secondary markets. Unlike ETFs, which are generally designed to track an index (and therefore trade close to their NAV), mutual funds and closed-end funds are typically more actively managed.

⁴ A fixed income ‘sector’ refers to the entity that issued the bond and has some crucial investment characteristics. Broadly speaking, government bonds and corporate bonds are the largest sectors of the bond market, but there are many other types. For instance, MSBFs invest in a range of sectors that include government bonds, but also investment grade corporate bonds, high-yield corporate bonds, mortgage bonds and municipal bonds. They can be also quite active in the financial derivatives associated with these sectors.

⁵ The database created in this paper is based on selection criteria that identify large investment bond funds that are active, rather than passive investment vehicles (such as ETFs and index funds); and have a mandate that allows them to invest in EMs. The database was constructed from a ranking of the largest investment funds by assets under management available in Bloomberg conditional on fulfilling these criteria.

size of multi-sector bond funds therefore risks that sudden portfolio reallocations may amplify asset price co-movements both within and across bond markets.

Figure 1. Stylized Presentation of Institutional Investors with EM Exposures



Multi-sector bond funds (MSBFs) are important investors in emerging markets fixed income. The global bond fund and MSBF sector boxes overlap as some of the latter could be categorized as global bond funds but others have considerably different remits. For example, global bond funds are traditionally more exposed to sovereign bonds than credit, while MSBFs can be large investors in corporate bonds.

Two main forces exacerbate their inherent potential for contagion risk. First, pressured by large client redemptions these funds may choose to liquidate their more liquid holdings which, given their broad remit and large size, could spread contagion across fixed income sectors and geographies. Second, these funds are active users of derivatives with embedded leverage. Over two-thirds of the investment in emerging markets of our multi-sector bond funds sample is managed by funds that report derivatives leverage (measured as gross notional exposure) in the 90 to 850 percent range. Excess leverage in their derivatives positions could further amplify the impact of losses from emerging market investments and spill over into other fixed income exposures when managers have to unwind investments to meet redemptions.

Moreover, the concentrated positions of MSBFs in certain segments of the local sovereign bond market can render parts of the domestic yield curve illiquid, which could potentially impair monetary policy transmission and exacerbate market pressures. On the flip side, to the extent that large positions may be hard to unwind, MSBFs may turn out to be stickier—albeit temporarily and not by choice—during periods of low liquidity.

This paper aims to shed some light on the risks posed by MSBFs to global financial stability, focusing especially on emerging markets. In doing so, the paper makes several contributions to

the literature on investment funds (domiciled in developed markets) that are invested in emerging economies.

First, the paper compiles quarterly portfolio information and displays in a systematic way the emerging market positions for a group of 40 large multi-sector bond funds in the post-crisis period (2009:Q4–2018:Q2).⁶ The detailed nature of this bottom-up exercise allows for a close look at the characteristics of these funds and their portfolio holdings. The value in this exercise stems from the omission of these investors from key databases, most often used in the literature to study international institutional investment funds. Analysis on this subject that is limited to data on country allocations from databases that are not representative could be flawed and lead to misleading conclusions.⁷ Second, the paper shows why exactly these investment funds are important, and thereby motivates why their exclusion from existing analyses is worrisome. Through multiple methods of analysis—balance sheet analysis, correlation of returns, and (fixed effects) panel regressions with interaction effects—we exploit the granularity in this novel database to first discuss and empirically analyze the different aspects of possible risks MSBFs pose in EMs (*‘Why’*). In a second step, we investigate the conditions under which such risk can materialize (*‘When’*). Finally, in contrast to most of the earlier literature that lacks MSBF representativeness, our focused approach on these specific asset managers deepens the understanding of investors in the broader context of EM portfolio flows and complements the existing work.

Our analysis reveals several important results. MSBFs are rapidly increasing in size with a large footprint across major bond sectors. They are highly concentrated—both in their positions and in their decision-making. As a result, we argue that they have become a more pertinent risk, especially in certain large EMs, than in the past (or than suggested in the early literature) and merit more policy attention. These funds exhibit opportunistic behavior and more than other investment funds.⁸ While there has been some debate as to whether these funds can be source of stability compared to dedicated funds, we provide further support for their relative activism. Moreover, MSBFs are active users of derivatives embedded leverage, and deleveraging-induced trading could generate contagion across assets that are linked solely through their common ownership. Further, we provide empirical evidence of MSBF’s potential to impact the markets they invest in. Another key finding suggests it matters not just that they are investing in EMs but also when they are investing—in periods of high risk aversion MSBF reallocations are more strongly associated with the underperformance of selected EM markets. Based on these findings we develop the theory of ‘perfect storm’ market conditions (sector-wide redemptions and risk aversion) that would incentivize unstable behavior and possible contagion in EMs.

⁶ This sample, therefore, does not capture developments due to the market stress related to the spread of Covid-19 in Q1 2020.

⁷ To ensure that our data is accurate and as representative as possible we aggregate country exposures from the bottom-up based on actual regulatory filings of individual investment funds available through the PORT function of Bloomberg, in contrast to voluntarily reported data (as is the case in various other databases).

⁸ An opportunistic investment strategy is typically a high-conviction investment approach with a high-return objective (outsized opportunity for excess return vs. targeted return), but generally also a riskier (often concentrated) profile. Typically, these investments are not clearly defined by asset allocation limitations and are unconstrained by region, size, or style.

The rest of the paper is organized as follows. The next section surveys the literature related to MSBFs and EMs. Section III describes the motivation for this study, starting with a description of the data, and an in-depth discussion of the key risks posed by MSBFs. Section IV relates in a parsimonious model the variation in MSBF holdings to market prices to assess if MSBFs can be associated with significant underperformance of bonds and currencies. Section V discusses a case study when a large fund family of MSBFs with concentrated investments was forced to raise liquidity to pay for client redemptions. Together with the implications of Section IV, this case study serves as a cautionary tale that forebodes the risks of MSBFs for EMs more broadly when the ‘right’ market conditions come together. Section VI discusses policy implications, and Section VII concludes.

II. LITERATURE REVIEW

While there is vast literature on EM capital flows, the scope of this paper is limited to fixed income portfolio investments from large (foreign) investors and the possible market/policy implications thereof. Looking at the research through this lens drastically narrows the body of work this paper relates to.

Bond funds. First, most of the literature on EM portfolio flows covers equity funds invested in EMs. In large part this is driven by the popularity of equities as a liquid asset class, as well as the availability of data. Data by the Investment Company Institute (2018) shows equity is and has been the largest investment category for investment funds, followed by bonds funds and money markets (Figure 2).

There is however a clear difference in the growth rate of these categories with bond funds growing at a faster pace than equity funds. As major central banks eased monetary policy and cut interest rates to extremely low levels for much of the past decade, investor demand may have responded to favorable returns on bonds—when interest rates fall, bond prices rise. Further, there is a significant difference in the dynamics of these flows with more volatility and substantially larger swings in bonds than in equities, especially during crises episodes such as the Global Financial Crisis and the Taper Tantrum.⁹ This is in line with the well-established view that some capital flows are more stable than others. Meaning, on the one hand, there are flows that are more volatile, less persistent, and more sensitive to fast-changing factors, sometimes dubbed “hot” money (e.g. portfolio debt). On the other hand, there are less volatile and more persistent flows that are mostly impacted by slow-moving factors, such as fundamentals (e.g. FDI).¹⁰ For

⁹ E.g., De la Torre, Didier and Pienknagura (2012, Ch.1 p.23–33) note that investors exited from EM bond funds quicker and more decisive than from EM equity funds going into the Global Financial Crisis, highlighting “there were large redemptions from emerging bond funds between July 2007 and July 2008 (of about 16.1 ppt of initial assets), while emerging equity funds had positive injections during the same period (of about 5.8 ppt of initial assets).” This pattern was repeated in following episodes, including the so-called Taper Tantrum in mid-2013 when the Fed signaled a possible reduction in stimulus by tapering its asset purchases.

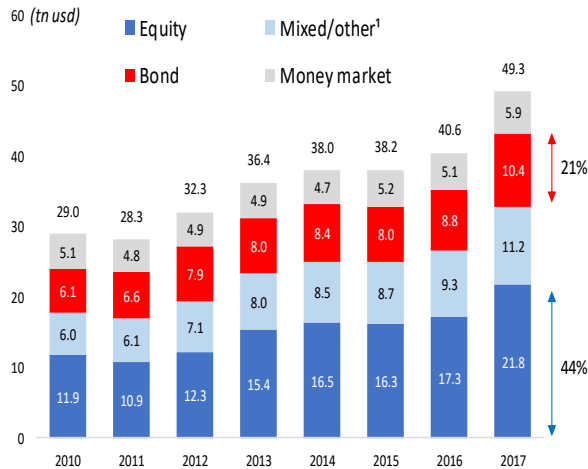
¹⁰ Apart from an early study by Claessens, et al. (1995), which based on simple capital flow characteristics (volatility, persistence, and predictability) argued there was a lack of evidence to support that “labels” of capital flows provide information about their time-series properties; later work on this topic mostly evidences and confirms differences in flow types and proneness to crises. This literature stretches over time and includes, among others, Chuhan, et al. (1996), Sarno and Taylor (1999), Prasad et

each of these reasons, bond investment funds and their implications for EM policy makers deserve a closer look.

Figure 2. Regulated Open-End Funds: Size and Change

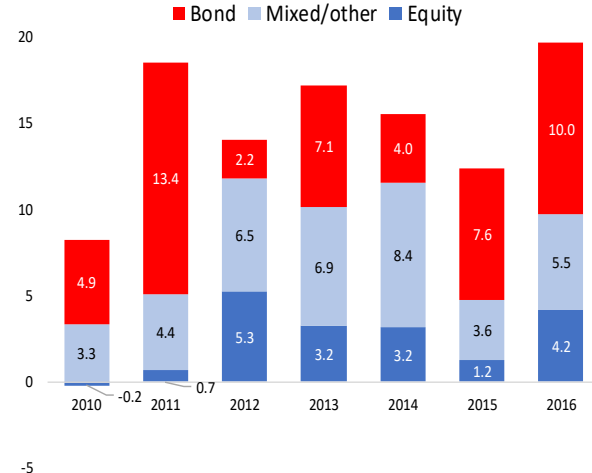
Total open-end fund assets surpassed \$49 trillion, with the largest share accounted for by equities ...

1. Total Net Assets of Worldwide Regulated Open-End Funds: by type of fund (Trillions of U.S. dollars; year-end, 2010–2017)



... however, bond funds have seen a steady rise with the largest intakes of capital in recent years.

2. Worldwide Net Sales of Regulated Open-End Long-Term Funds (Percent of assets per type of fund)



Source: Investment Company Institute (based International Investment Funds Association data).

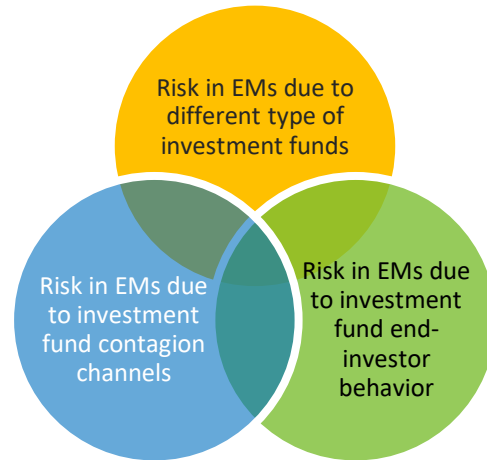
Note: Regulated open-end funds include mutual funds, ETFs, and institutional funds. Mixed/other funds include balanced/mixed funds, guaranteed/protected funds, real estate funds, and other funds. In Fig. 1.2. Long-term funds include equity funds, mixed/other funds, and bond funds, but exclude money market funds.

Micro-level data. Second, many studies in the literature that deal with EM portfolio flows consider country portfolios inferred from aggregate capital flow data (e.g., from balance of payments accounts) or aggregated subcomponents (e.g., FDI, portfolio investments and other investments). This type of analysis has its use, for instance to study drivers of flows such as push-and pull factors; but the examination of the behavior and effects of a specific type of asset manager is microeconomic in nature, and in turn requires studying capital flows at the micro level of individual funds. Comparatively few empirical papers take the micro perspective, though recent research has started to fill in this gap with some notable exceptions on bond funds. A caveat to this emerging research, which is a key motivation for this paper, is that it mostly uses the Emerging Portfolio Fund Research (EPFR) Global database. As discussed in more detail below, this database offers many benefits, especially high frequency, and it well represents the overall investment funds universe. However, it is not well suited to study the increasingly important group of foreign portfolio investors that is the subject of this paper: large multi-sector bond funds.

al. (2003), Daude and Fratzscher (2008), Forbes and Warnock (2012), Bluedorn et al. (2013), Catão and Milesi-Ferretti (2013), Cerutti et al. (2015), Pagliari and Hannan (2017). A useful survey is provided in Levy-Yeyati and Zúñiga (2015).

In the relatively thin body of work that studies (i) EM bond funds (ii) at the micro level, our paper ties into different, albeit related literature strands that focus on risks in EMs due to (1) the type of investment fund; (2) investment fund end-investor behavior; (3) contagion channels (Figure 3).

Figure 3. Stylized Presentation of Literature Strands on EM Risks Due to International Investment Fund Portfolio Debt Flows



First, this paper is related to the work that tries to understand the differences between types of bond funds and their behavior. A notable recent paper by Brandão-Marques et al. (2015) examines (EPFR) investment fund-level flow data into EM bond (and equity) markets, differentiating between types of funds to detect behavioral differences. The authors find that bond funds are sensitive to global financial shocks and engage in return-chasing.¹¹ These results echo previous studies on investment fund behavior.¹² More surprising and interesting for our research, the authors argue that within the category of bond funds, global funds are a *more* stable source of capital flows than EM-dedicated funds are. The authors suggest that less volatile flows from ultimate investors explain global funds’ comparatively more stable portfolio flows—i.e., less prone to surges or sudden stops. Put differently, the paper argues that global bond funds have *less* volatile end-investor and are generally *less* sensitive to global financial conditions, as well as display a weaker tendency to engage in return chasing than EM-dedicated bond funds. As duly noted by the authors, this finding runs directly against the “widely-held perception that [global]

¹¹ The empirical analysis employs panel regressions of investment fund-level flow data into EM bond (and equity) markets (normalized by AUM) with country-fund fixed effects, controlling for global conditions, local macroeconomic conditions, a proxy for search-for-yield (ST yield differential), and a proxy for return chasing (lagged returns). In a second step the panel regressions are expanded with multiple dummies for investment fund characteristics.

¹² For bond funds, see Xiao (2007). The findings of EM funds adopting momentum strategies and chasing returns are also in line with those strategies observed in equity funds by, among others, Grinblatt, et al. (1995) and Froot, et al. (2001), Bollen and Busse (2004), and Kaminsky et al. (2004).

Despite the unambiguous finding of investment fund return-chasing, which type of fund (bond vs equity) exhibits stronger return-chasing behavior is less clear. For instance, unlike Brandão-Marques et al. (2015), who find stronger return-chasing in bond funds than in equity funds, Raddatz and Schmukler (2012) argue that bond fund managers allow significantly less (short-run) pass-through from returns to country weights (than equity fund managers).

funds are a more volatile source of funding for EMs, because their fund managers can reallocate their portfolios completely away from EMs.” This perception is sometimes motivated by the idea that global fund managers opportunistically invest in EMs to improve returns and, when returns are unsatisfactory, can reallocate away from EMs, unlike dedicated funds which usually reallocate within the asset class. As a subsidiary explanation, it is sometimes speculated that their investors perhaps have less specialized knowledge of specific EM countries than dedicated investors do or are less sophisticated (less informed) investors that are more sensitive to push factors and less to local pull factors.¹³

In a paper related to Brandão-Marques et al. (2015), Converse et al. (2018) compare the sensitivity of different types of institutional investors (in EPFR data) to examine behavioral differences, but study fund flows rather than country flows.¹⁴ Their paper analyzes two different types of funds—ETFs and traditional open-ended investment funds. The authors’ interest is not explicitly on different types of investment funds, but rather how they compare to ETFs. Nevertheless, their analysis comparing global/regional versus country funds suggests that global bond funds are *more* sensitive to global conditions than country bond funds, contrasting Brandão-Marques et al. (2015).¹⁵

Second, another strand of the literature has examined risks related to fixed income investment funds by focusing specifically on the end-investor in which fund flows originate and how they interact with fund managers. As noted in Kaminsky et al. (2001), although investment funds are usually included among institutional investors, they differ from hedge funds, pension funds, and insurance companies in the degree to which underlying investors control portfolio size. That is, investment fund behavior is co-determined by the decisions of managers *and* end-investors. Raddatz and Schmukler (2012), Miyajima and Shim (2014), and Shek et al. (2018) explore (using EPFR data) whether portfolio decisions of fund managers are different from those of end-investors, and how their behavior affects EM bond fund investment dynamics.¹⁶

¹³ Empirical studies suggest that informational asymmetries may play a role in biasing investors towards domestic assets. The seminal papers by French and Poterba (1991), and Tesar and Werner (1995) initially documented the home bias in (aggregate) equity markets. In later work, Hau and Rey (2008) present stylized facts on home bias at the fund level (again for equities), albeit with strong heterogeneity depending on fund characteristics.

Expanding this logic from equity funds to fixed income investment funds domiciled in advanced economies; one arrives at a theory based on information asymmetries on why global bond funds (active but less specialized in EMs) may more easily retreat from emerging markets than EM dedicated bond funds (fully invested and specialized).

¹⁴ The authors similarly employ a micro-level fund flow measure normalized by AUM in a panel regression analysis (with fixed effects) that includes dummy variables for fund specific characteristics and controls for push and pull factors.

¹⁵ The paper further suggests that institutional investors, as an increasingly important channel for international capital flows, have amplified the transmission of global risk shocks to EMs. This, the authors argue, is especially the case for ETFs, for which the sensitivity to global risk factors for bond (equity) ETFs is 1.25 (1.5) times higher than for bond (equity) mutual funds. ETF flows respond much less, if at all, to changing economic conditions in the countries in which the funds invest—an uncontroversial result given the passive investing nature of ETFs.

¹⁶ Another early paper in this field making use of (EPFR) investment fund data to assess EM portfolio flows, Borensztein and Gelos (2003), compares open-ended funds with closed-ended funds (distinguishing also between global, regional and single-country funds). Although the paper considers (mostly EM-dedicated) equity, rather than bond funds, the results suggest little to “some” (statistically significant) herding behavior, and more in open-end funds than in closed-end funds. This would suggest that fund reallocations are driven more by end-investors, rather than fund managers. Kaminsky, et al. (2004), similarly, explore the

Raddatz and Schmukler (2012) consider micro-level data on investment funds in bonds (and equities) over 15 years to examine fund portfolio decisions. Raddatz and Schmukler's sample is especially relevant as it focuses on global bond investment funds. The paper reports that both the underlying investors, through injections/redemptions; and the fund managers, through managerial changes in country weights and cash, drive the volatility of investment fund allocations.¹⁷ A key point the authors emphasize is that investors, and asset managers responding in turn, do not act as “deep-pocket” investors (buying assets at fire-sale/discount prices when less informed investors run for the exits). Both investors and managers respond to country returns and crises and adjust their investments substantially, generating large reallocations. As a result, investment fund EM assets fluctuate greatly and pro-cyclically over time—retreat in bad times and increase it in good times. Put differently, capital flows from investment funds seem to amplify cycles and expose countries in their portfolios to foreign shocks.

Miyajima and Shim (2014) similarly highlight the behavior of ultimate investors, who may inject or redeem funds simultaneously and force fund manager portfolio reallocations, as an important channel for correlated behavior in EM bond markets. Co-movement from ultimate investors to investment funds, the authors argue, is also larger than co-movement among institutional investors. In addition, the authors discuss the use of benchmark indices as another such mechanism—the more benchmarked, i.e., less active/more passive, the higher possible co-movement of the managers/assets tied to the same benchmark.¹⁸ In their sample of EM-dedicated (global and regional) bond funds, the authors unsurprisingly find that overall EM-dedicated bond funds tend to follow their benchmark weights quite closely (their estimated coefficient to the benchmark weight is 0.87). In contrast, the coefficient on the benchmark weight is smaller in a similar regression analysis conducted by Raddatz et al. (2017) for all global and regional developed and emerging market bond funds in their study¹⁹ (although over a different sample

trading strategies of equity investment funds in EMs, distinguishing between the behavior of fund managers and underlying investors, and also find that the volatility of open-end investment funds in EMs is primarily driven by end-investors rather than by the decisions of fund asset managers.

¹⁷ The authors use panel regressions to empirically study investor responses to local and international conditions. The paper links end-investor injections into a fund to attributes that vary at the fund level and over time. That is, it regresses injections on variables measuring crisis incidences (both at the countries of destiny of a fund and the global level), returns of the fund, and returns of its country of origin. Second, the paper studies the behavior of fund managers, using an expression for portfolio weights in a regression that depends on lagged weights, relative returns, and the occurrence of crises (estimated with country-fund fixed effects). The analysis further decomposes flows into the growth rate of country weights and the growth rate of total investment fund assets or injections for different regions to evidence that both managers and the underlying investors play a significant role in explaining the level and fluctuations of international portfolio flows.

¹⁸ The paper uses a clustering measure, based on the number of funds facing net inflows relative to those facing net inflows or outflows for assessing co-movements. Meanwhile, the influence of indices on fund country allocations is assessed with panel regressions of fund country weights run on benchmark weights for funds with different degrees of activism (determined using a benchmark diversion metric).

¹⁹ Raddatz et al. (2017) primary interest is to study how benchmarks affect international financial markets. Part of their analysis comprises panel regressions to estimate the relation between investment fund country weights and benchmark weights for investment fund flows, and to quantify the importance of benchmarks for capital flows. Their sample includes multi-country (equity and bond) investment funds over the period 1996-2014. The estimation results suggest that overall a one percent increase in a country's benchmark weight results in a 0.7 percent increase in the weight of that country for investment funds that follow that benchmark. However, the benchmark effect explains “only” about 50 percent of the allocations of the most active funds (and, unsurprisingly, is nearly one-to-one for index funds).

period). This difference implies that global and regional emerging market bond funds act more passively than overall global and regional bond funds. Put differently, portfolio allocations from active funds are expected to be less predictable than from passive funds. Thus, from the perspective of risk due to (large) unexpected liquidation moves, active funds are ‘riskier’. For instance, for a (more passive) EM-dedicated fund, ex-ante, one is less likely to expect full liquidation from one country, and rather see proportional changes in line with the relevant benchmark, than one is to expect for a (more active) global fund—another red flag for MSBFs.

Shek et al. (2018) also focus on global (EM-dedicated) investment bond funds and study the interaction of redemption-driven sales and ‘discretionary bond sales’ by fund managers. More specifically, the paper examines if changes in investment fund EM bond holdings are driven primarily by investor redemptions or if there is a significant role for discretionary bond sales beyond what is implied by redemptions. Their results suggest that fund flows, in fact, are also significantly driven by asset allocation decisions of portfolio managers (in addition to end-investors). In line with previous papers, they provide additional evidence that fund manager sales tend to amplify the sales driven by redemptions by end-investors, instead of cushioning the investor-driven flows by “leaning against the wind” to pick up cheap assets.²⁰

Third, our paper as well as the previously discussed work, falls into the literature on contagion effects due to (fixed income) investment fund portfolio rebalancing. A seminal paper on the propagation of shocks through funds in the EM universe, Jotikasthira et al. (2012), analyzes (EPFR) global funds between 1996 and 2009. The paper does not differentiate between types of global funds but explores how funding shocks from the investor base in (bond and equity) funds domiciled in developed markets affect fund portfolio allocations in EMs. The authors find that changes in investor flows force substantial portfolio reallocations,²¹ causing fire sales (and purchases) for countries included in the fund portfolio, as well as correlation not just between EMs but also across global markets.²²

The “global contagion” channel identified by Jotikasthira et al. (2012) supports previous work. Kaminsky et al. (2001) paint a picture of the spillover effects in the Mexican, Asian, and Russian crises due to dedicated emerging market investment funds’ unstable investment behavior,

²⁰ The authors argue that co-movement of redemptions and discretionary sales is driven by hoarding of cash by fund managers to meet possible future redemptions in unsettled markets. This rationale also underlies the paper’s empirical method to identify flow-driven and discretionary bond purchases and sales. The authors estimate discretionary sales by comparing changes in fund cash holdings over a time period with the net inflows from investors during the same period.

²¹ The paper relies on an estimate of EM capital that is exposed to flow-induced trading. This estimate is determined by (i) taking the product of the dollars allocated by each fund to each country with the percentage of flows experienced by the fund; and then (ii) aggregating this measure across all funds in every period.

²² The paper suggests that fire sales are important beyond just equity markets, but the authors document that portfolio rebalancing can drive EM equity market returns. Thereby corroborating on the micro-level previous work that associates foreign portfolio flows with local market equity returns. In earlier work, Warther (1995), studied not just equity but also bond funds as a rare exception of the time; and, examining aggregate mutual fund flows and returns in the U.S., the author finds evidence that returns affect subsequent flows, but also that fund flows strongly influence returns. Later studies venture beyond the U.S. but focus solely on institutional equity investments and their relation to returns, including Froot et al. (2001), Bekaert, et. Al (2002), Borensztein and Gelos (2003), Kaminsky et al. (2004), Froot and Ramadorai (2008). Meanwhile Jinjark et al. (2011) provide evidence for the relationship between international portfolio flows and returns for both equity and bond funds.

interpreted by the authors as volatile investments with large redemptions and injections relative to total assets under management.²³ In later work, Puy (2016) identifies portfolio flow dynamics in bond (and equity) funds at the global level and quantifies the global impact of investment fund portfolio rebalancing.²⁴ In doing so, the paper finds evidence for both global contagion in bond flows (and equity flows), and regional contagion in bond flows. The results show strong synchronization of flows suggesting there is a common driver in international portfolio funding. The global factors, or “push” effects driving global contagion affect especially developing countries. Because, the author argues, when faced with a shock at home (economic news/financial stress), investors tend to cut (or increase) their exposure to risky countries to a greater extent than their domestic exposures. These dynamics give rise to strong cycles and co-movement in international portfolio flows emanating from the fund industry.

Stronger co-movement in global bond markets, especially in crises, might be—at least in part—a symptom of the growing importance of non-dedicated investors, such as multi-sector bond funds that invest both in developed and emerging economies. The study of the drivers, and relative importance of global push factors versus local pull factors for portfolio flows is not the explicit topic of this paper.²⁵ Nevertheless, it is worth noting that the empirical literature points to increasing co-movement in global bond markets (e.g., Cerutti et al., 2015), especially in crises, as the role of investment funds in countries’ foreign investor base rises. If these trends continue, portfolio flows to EMs are likely to become more sensitive to global financial shocks.²⁶ In a relatively early paper, Sy and Ong (2004) discuss at length this risk due to the at-that-time still nascent group of “crossover funds”²⁷ with a growing presence in EMs. The authors estimate with some back-of-the-envelope calculations the contemporary asset size in EM allocations due to global and EM-dedicated investment funds. Based on these estimates they

²³ See also IMF GFSR April 2015 “Chapter 3: The asset management industry and financial stability” for a discussion. Meanwhile Gelos (2011) provides a survey of the empirical literature on this topic; though, as the investment fund literature more broadly, contains many papers on equities. An oft-referenced example worth mentioning is Broner et al.’s (2006) study of equity funds, which similarly highlights that portfolio rebalancing due to relative performance concerns can transmit shocks across EMs beyond what is implied by fundamentals.

²⁴ Decomposes bond (and equity) flows into global, regional and idiosyncratic components, using a Bayesian dynamic latent factor model.

²⁵ There is vast literature on EM capital flows that studies push and pull factors. Most of these papers consider aggregate capital flows, or subcomponents. Fratzscher (2012) is an exception, that assesses the relative importance of global push and local pull factors for portfolio capital flows in and out of EMs during and around the 2007–08 global financial crisis, using (EPFR) investment fund data (though does not distinguish between equity and bond flows). Using a factor model with a set of global/common factors and a set of domestic/idiosyncratic factors, the paper shows that the drivers of capital flows during the crisis changed substantially. During crisis, global factor become more dominant, reflecting a flight-to-safety: more risk, more EM; and, the paper notes, EM bonds particularly suffer in this scenario.

²⁶ See IMF GFSR April 2014: Chapter 2. “How Do Changes in the Investor Base and Financial Deepening Affect Emerging Market Economies?” And IMF GFSR April 2018: Chapter 1. “A Bumpy Road Ahead - Vulnerabilities in Emerging Markets, Low-Income Countries, and China”.

²⁷ This is another term sometimes used to describe investors that are typically more opportunistic and generally invest without or with minimal constraints on asset type, region, size, or style (such as MSBFs). Given their ‘crossover’ nature they are considered possibly “more susceptible to developments in competing and complementary asset classes. As a result, [portfolio flows] by crossover investors tend to be more volatile as they go in and out of the asset class, while dedicated investors usually trade within the asset class.” (IMF GFSR September 2003 Chapter 4: 2003. “Volatility of Private Capital Flows to Emerging Markets”).

argue that in the early 2000s global bond fund investments in EMs, “while not inconsequential in aggregate, could not (yet) be solely responsible for the observed volatility during market events,” as their holdings were still (much) less important relative to those of domestic investors.²⁸ Nevertheless, the paper clearly highlights the potential of global funds that are invested in both developed economies and in EMs to exacerbate market volatility, as extensively described in later work.

In sum, our paper relates to three key strands in the limited literature on risk in EMs due to international fixed income investment funds, based on micro-data. A first strand clearly shows that different types of investment funds are likely to behave differently owing to distinctive mandates, constraints, and EM expertise—e.g., EM-dedicated funds are constrained to invest in EMs and possibly possess better EM expertise than global funds. Despite agreement on the existence of such differences, there is some disagreement on the implications for their volatility and comparative sensitivity to global conditions (e.g., Brandão-Marques et al. (2015) vs. Converse et al. (2018)). With the benefit of a new and improved dataset on global funds, this paper aims to contribute to this strand of the literature and shed light on which types of investors are more “destabilizing” for EMs. The second strand of the literature is less ambiguous in its findings. That is, redemptions (inflows) by end-investor in which fund flows originate and investment fund managers sales (purchases), tend to amplify each other, generating large reallocations and volatile EM capital flows. As a result, investment fund behavior tends to be pro-cyclical, especially during crises. When faced with a shock, active global fund reallocation behavior tends to be less predictive—this paper will present further evidence to corroborate this view. Finally, on the contagion and transmission channel of shocks across countries, several papers conclude that global investment funds increasingly play (or could play) an important role, producing volatile and potentially disruptive capital flows. Given the growth in the assets of MSBFs, this paper also investigates if these contagion risks, together with concentration risks, and risks of policy impairment, appear to become more pertinent.

III. MOTIVATION

A. Sample Representativeness

MSBFs lack a representative dataset. The literature associated with MSBFs is not only scarce but a representative database that systematically covers MSBFs is non-existent. There are various datasets that offer partial information on EM country allocations. The most widely accessible and often-used dataset in papers that consider bond funds comparable to MSBFs is the EPFR database.²⁹ Whilst being a useful data source, EPFR does not provide a representative sample for the country allocation to emerging markets of global investment bond funds.

²⁸ See also IMF (2004). This stability report describes the change in the institutional investor base for emerging markets, and the large potential risks and volatility it accompanies. Along the same lines as Sy and Ong (2004), however, the report is cautious to assign a significant role to crossover (open-end) investment funds in exacerbating EM volatility. As these new institutional investors had not experienced a major systemic EM crisis, and the size of their EM allocation was still relatively small.

²⁹ Other databases that have been used in the empirical literature on international investment funds, albeit mostly for equity portfolio flows, include State Street Bank and Trust (SSB), the Securities and Exchange Commission (SEC), the Treasury

First, the worldwide bond universe comprises about \$10 trillion of assets under management, according to ICI data (2018), which is reasonably well represented in EPFR with about \$7.5 trillion of assets in total coverage. However, global bond funds, which are the closest equivalent to our group of interest, are less well represented. Global bond funds that report country allocations in EPFR total just \$290 billion in aggregate assets for 121 funds, or less than 3 percent of the total bond universe, as of writing this paper. In contrast, our sample of MSBFs hold some \$1 trillion in total assets, or 10 percent of the total bond universe. Our sample is (purposely) restricted to 40 investment funds that hold a minimum of \$2.5 billion of assets under management.³⁰ Although the share of the fixed income market that is captured by EPFR is indicative of the breath of the dataset; the sheer size of a sample does not guarantee its ability to accurately represent a target population, which brings us to the second (and more important) critique: composition. Not only do the global bond funds in EPFR represent a significantly lower share of the global investor base in emerging markets, but they are unlikely to be representative of the funds that pose greater risks to global financial stability.

What characterizes a (potentially) systemically important type of fund? Studies aimed at assessing possible financial stability risks due to investment funds should at least include, and ideally focus on funds with a potentially (negative) impact on the financial system and market dynamics. To inform us on a ‘good’ example of this type of fund, we rely on the Financial Stability Board (FSB). In a consultation paper the FSB (2014) proposed a methodology (and indicators) to assess whether an individual investment fund is systemically important in the investment management space. This paper identified size (including and excluding leverage), substitutability, interconnectedness, complexity and cross-jurisdictional activities as potential drivers of systemic financial risk.³¹ Relying on FSB guidance and bounded by the limitation of data availability, this paper specified the criteria listed below for the selection of the investment fund sample. The resulting sample bears some characteristics (see next section) that also explain the name: “Multi-Sector Bond Funds” (MSBFs).

1) **Materiality threshold (size):** The motivation for selecting sufficiently large funds is simple: with an eye on assessing risk, one would like to focus on funds that may be dominant in the markets in which they invest and therefore affect the price action and liquidity of its underlying investments. Also, the larger the fund, the greater its potential impact on counterparties, markets and other market participants that may depend on it for critical functions (FSB, 2014). Thus, while smaller investment funds could be defined as “MSBFs” (broad mandate, active), for sampling and practicality purposes, those funds with a (individually) potentially smaller impact on the markets are excluded from further analysis in this paper.

2) **Cross-jurisdictional activities:** Developed-market domiciled but with EM exposure. A global investment exposure and the extent of cross-jurisdictional activities is an essential factor in determining the possible spillover of the distress (or failure) of an investment fund. The more

International CapitalSystem (TIC) data on net foreign transactions of U.S. investors, Frank Russell, AMG Data Services, Lipper Fund Data from Thomson Reuters, and Morningstar.

³⁰ Future research could look at increasing the size of this sample of MSBFs by, for example, also including smaller investment funds that can be defined as MSBFs below our minimum threshold of \$2.5 billion of assets under management.

³¹ The paper considers these factors in the context of regulated funds and asset managers but also private less-regulated funds.

cross-border activities an investment fund engages in, the more likely its distress in one region will spill over into another, even if solely by their common ownership in the portfolio. This criterion is specified based on geography, but by the same token it can be extended to cross-sectional allocations across fixed-income sectors and different instruments.

3) Active investment style: Not blindly adhering to an index typically involves shifting investments in a less gradual manner, in variable size, and/or possibly into less liquid, higher return markets (not part of an index).³² As highlighted in the FSB framework, the degree of illiquidity could contribute to the complexity of the portfolio (e.g., more difficult to price). Concentrated illiquid positions could also make an individual counterparty highly reliant on an investment fund, lowering the fund's substitutability. Further, illiquid positions, and no fixed investment mandate (less predictability) could pose an increased risk of contagion, as distressed illiquid (difficult to price) assets could result in downward adjustments across the portfolio, not just of similar but also (perhaps especially) more liquid assets.³³

With this representative and (potentially) systemically important fund (large, global exposure, active, concentrated) in mind, our sample of MSBFs still includes five out of the top ten funds globally, according to Bloomberg.³⁴ The omitted investment funds from Bloomberg's top ten are either passive (4), or have no EM holdings (1). In contrast, of the 121 global bonds that report in EPFR, only four have assets under management in excess of \$10 billion. Of those four funds, two are passive (i.e., non-active) investment vehicles.³⁵ To put this in perspective, just one of the EPFR global bond funds ranks among Bloomberg's top ten in terms of assets, and again this single example is a passive asset allocator. With key parts of the target population not included in the sample population, researchers studying global investment funds using EPFR potentially face a selection bias that precludes the claim that their sample is representative of the target population.

In addition, there is an overlap of just four funds between our sample of MSBFs and the widely used EPFR Global Bond fund database. This limited overlap evidences the gap in the analysis on global funds that was highlighted in previous paragraphs. Thus, in the broader context of portfolio flows due to institutional investors our aim is originality, but our approach is also an important complement to the existing literature.

³²An active investment style can have a positive financial market impact if active investors act countercyclically and support distressed markets with falling prices (market-stabilizing), or if they provide capital in illiquid (but otherwise well-functioning) markets.

³³ The active use of derivatives leverage also contributes to the complexity of the portfolio and poses risks. Although it characterizes MSBFs (as later analysis will show), and further differentiates them from the more dedicated benchmark-type investment funds, derivatives leverage is not used as a selection criterium.

³⁴ Bloomberg provides a ranking of the largest investment funds by sector globally.

³⁵ Passive investment funds are vehicles that closely track benchmarks. The most popular examples are index-trackers and ETFs, which have become popular due to their low fees and, in the case of ETFs, access to better (intra-day) liquidity.

In sum, the focus of this paper is to improve our understanding of foreign investor risks in emerging markets due to a specific type investment fund. Analysis on this subject that is limited to data on country allocations of “global funds” from databases such as EPFR could be flawed and lead to misleading conclusions given limited coverage. To mitigate this risk this paper presents and exploits a largely unused dataset.

Sample Characteristics: Snapshot

This section provides a snapshot overview of our average MSBF portfolio. Although there is considerable cross-fund heterogeneity, the overall assets under management of the average sample fund ranged from a minimum of \$14 billion to a maximum of \$24.13 billion during the 2009:Q4–2018:Q2 period (avg. \$19.9 billion). Table 1 provides a breakdown of this average portfolio.³⁶

**Table 1. Average MSBF Portfolio Composition
(Percent)**

	Total Assets	Including							Equity	Cash
		Fixed Income	Sovereign	Pass-Throughs	Sovereign Agency Debt	TBAs	Corporate (incl. SOEs)	Supra-National Debt		
Total Portfolio	100	93.3	52.6	8.5	1.5	6.1	40.4	0.3	4.9	1.9
EM Portfolio	18.0	17.2	12.3	0.0	0.1	0.0	4.6	0.3	0.7	0.2
AE Portfolio	82.0	76.1	40.3	8.5	1.4	6.1	35.8	0.0	4.2	1.7

Sources: Bloomberg Finance L.P.; and authors' calculations.

Breaks down the composition of the average MSBF portfolio from 2009:Q4 – 2018:Q2. Numbers might not add up perfectly due to rounding. Cash includes, besides currency holdings, also a range of cash equivalents and financial options.

Table 1 shows the average allocation to emerging (EM) and advanced (AE) economies in our MSBF portfolio over the sample period, which indicates that:

- EM assets, on average, represent a **significant share of the aggregate MSBF portfolio** (18 percent).
- Although there is no formal restriction on asset types that can be included in the portfolio (e.g., there are minor equity and cash holdings), funds in the sample are heavily **focused on fixed income**, irrespective of the economy type, with holdings **in various fixed income sectors**.
- Within the overwhelming focus on fixed income, the breakdown by security shows that **sovereign debt represents a significantly larger share in the EM portfolio** than in the AE portfolio. This is unsurprising given the comparatively limited size, liquidity, overall higher credit risk and lower information availability in EM credit markets. EM sovereign issuers dominate domestic securities markets even in countries where corporate markets

³⁶ Appendix 3 provides a description of the characteristics of the aggregate MSBF portfolio over time for 2009:Q4–2018:Q2, instead of a static snapshot of the average.

are more developed, and then the corporate activity is still restricted to top-tier companies.

- The allocation to EM sovereign debt accounts for about 12 percent of total assets (i.e., 25 percent of the total sovereign fixed income portfolio). In contrast, EM corporate debt represents a comparatively smaller share of the total corporate fixed income portfolio, accounting for about 5 percent of the total portfolio (i.e., 12 percent of the total corporate fixed income portfolio).
- It is important to highlight that the previous observation still understates the degree of MSBF exposure to EM sovereigns, especially when compared to AEs.
 - That is, in AEs securities such as ‘Sovereign Agency Debt’, or others related to sovereign agencies (e.g., ‘Pass-throughs’, ‘TBAs’ and others) are easily identified and included in the sovereign category. However, in EMs, such security categories do not exist or represent a very small share of the assets, as reflected in the table.
 - Further, corporates with a tie to the sovereign, be it formal sovereign owned enterprises (SOEs) or informally backed firms, typically represent a large share of key parts of the economy in EMs compared to AEs. Accordingly, the EM corporate fixed income exposure of MSBFs also includes a much larger share of SOEs.
 - The inclusion of SOE bonds into the sovereign category or the inclusion of all sovereign agency debt into the corporate section would increase the difference between EMs and AEs in the share of the portfolio allocated to sovereign debt.

These first impressions clarify the origin of the name “Multi-Sector Bond Funds” to describe the sample. A more granular dissection of the MSBF portfolio, but focusing on EMs, shows more interesting observations. Table 2 (see next page) dissects the average main asset types by currency type and by region in the portfolios of MSBFs (over the sample period).

- **Most EM investments are held in local currency**, amounting to almost two thirds of all EM investments by MSBFs – most fixed income is in local currency, and equity (as one would expect) is nearly all local currency.
- MSBFs held positions in all EM regions. Focusing on fixed income, the largest **recipient regions (by far) are Latin America (LAC) with 37.6 percent and Asia (33.5 percent)**, where the largest and most liquid EM local currency markets are; followed by Eastern Europe and Central Asia (21.5 percent). The Middle East and North Africa (4.6 percent) and Sub-Saharan Africa (2.8 percent) have received comparatively fewer flows across the sample horizon.
- Within regions, it stands out that local currency debt investment is particularly of choice in Asian debt markets, where it is nearly five times larger than hard currency debt investments. In contrast, in Latin America, although local currency debt still dominates in volume, hard currency investments are comparatively larger.³⁷

³⁷ This could be a lingering result of Latin America’s rich history of defaults, especially as compared to other regions.

- In Eastern Europe hard currency debt (11.8 percent) and local currency debt (9.5 percent) holdings are more evenly split, which is not all too surprising given the proximity or close relation many countries have with the Eurozone. In Africa, similarly local and hard currency debt holdings are about the same proportion (1-1.5 percent), while in MENA hard currency debt (3.3 percent) has the overhand over local currency debt as a share of the investments of MSBFs.

Table 2. MSBF EM Portfolio Breakdown

Currency Type	Region	Total	Fixed Income	Equity	Cash
All	Global	100.00	95.27	3.72	1.01
	AFR	2.84	2.61	0.23	0.01
	Asia	33.47	30.31	2.69	0.47
	ECA	21.49	21.28	0.15	0.05
	LAC	37.63	36.60	0.58	0.45
	MENA	4.57	4.46	0.07	0.03
Hard	Global	34.23	33.12	0.33	0.78
	AFR	1.58	1.47	0.11	0.00
	Asia	5.78	5.39	0.01	0.38
	ECA	11.88	11.82	0.02	0.04
	LAC	11.63	11.16	0.14	0.33
	MENA	3.36	3.27	0.06	0.03
Local	Global	65.77	61.15	3.39	0.23
	AFR	1.26	1.14	0.12	0.01
	Asia	27.69	24.92	2.68	0.09
	ECA	9.61	9.46	0.13	0.01
	LAC	26.00	25.44	0.44	0.12
	MENA	1.21	1.19	0.02	0.00

Sources: Bloomberg Finance L.P.; and authors' calculations.

B. Why Care about MSBFs in EMs?

Exposure Size in EMs

In the last decade, the assets of multi-sector bond funds and their allocation to EMs saw strong growth. Extremely accommodative monetary policies following the global financial crisis, provided the impetus for investors to reach for yield. Thus, with low yields in advanced economies, reasonable global growth and attractive valuations for fixed income instruments; investors have increasingly added exposure to a broad array of income-focused fixed income strategies in emerging markets. Through their allocation to global bond markets investors also reaped diversification gains with exposure to a greater number of securities, markets, and economic and inflation environments. In doing so, large multi-sector bond funds have become important investors in emerging market fixed income and play an increasingly significant role in driving portfolio flows.

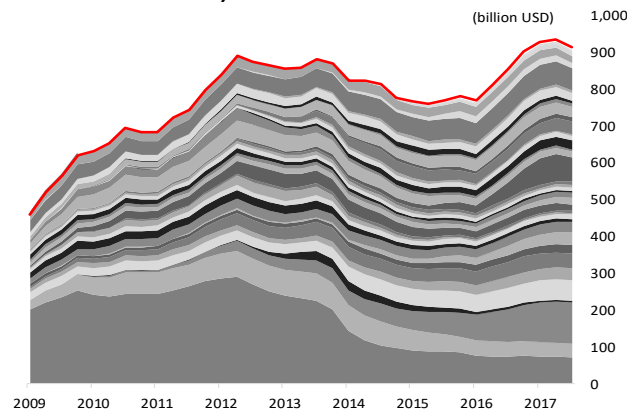
The combination of rapid asset growth and a growing share going into emerging markets can mean that even a relatively small fraction of the aggregate MSBF portfolio could be important in some of these economies, given the relatively small size of their capital markets. Moreover, the relative illiquidity in some markets could amplify the effects of any portfolio rebalancing. The composition of this group of investors also changed over time. In the first five years a single investment fund accounted for some 25–30 percent of all assets under management, but recently more investment funds have been created and others have taken a more prominent role (see Figure 4, panel 1). Nevertheless, the sector remains heavily concentrated, especially when considering whole fund families, as discussed below, while EM bonds occupy a growing share of MSBF portfolios (see Figure 4, panel 2).

Figure 4. Multi-Sector Bond Funds: Size and EM Exposure

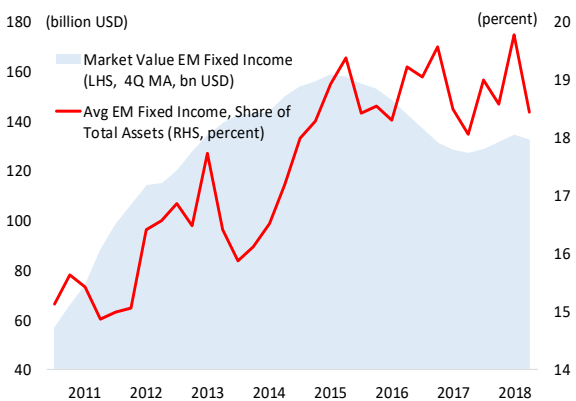
There has been strong growth in the assets of the multi-sector bond fund sector ...

... while EM bonds occupy a large and growing share of MSBF portfolios.

1. MSBFs Assets under Management (Billions of U.S. dollars, different shades indicate different funds)



2. MSBFs EM Fixed Income Exposure (Percent, billions of U.S. dollars)



Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: The sample comprises 40 large multi-sector bond funds, domiciled in the U.S. and Europe over the period 2009:Q4–2018:Q2.

Concentration

There are two different perspectives from which we can consider concentration in the context of MSBFs. First, there is concentration from the perspective of the recipient economies. A small group of large EMs strongly dominates in MSBF portfolios, especially when differentiating between currencies—a few EMs account for the lion's share of EM local currency debt held by MSBFs. These concentrated exposures are worrisome in the context of liquidation and refinancing risk because not only are they significant in absolute size but also relative to the recipient countries' foreign investor base. Second, investment decision-making is highly concentrated in MSBFs. At the individual fund level, the portfolio manager of a MSBF is responsible for asset allocation decisions, unlike in a dedicated bond fund, where the decision to invest in emerging markets rests with their many end-investors. At the fund family level, there is correlated behavior risk across funds that belong to the same family of funds. Correlated decision-making may be problematic as the two largest family of funds own about 60 percent of

all EM bond investments by MSBFs. Much like at the individual fund level, the concentration in investment decisions contrasts with EM-dedicated bond funds where there is less activism, and a more even distribution of assets across fund manager groups.

Concentration in the markets of a few recipient economies

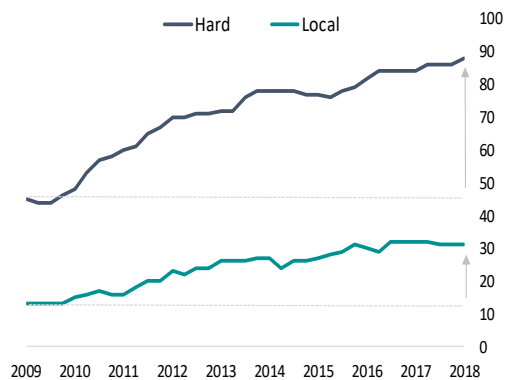
MSBFs are highly concentrated investors in the markets of a few recipient economies.

While MSBFs are investing in a greater number of countries and EM portfolio debt inflows are getting more geographically dispersed, the fixed income markets of a few economies remain the main recipients. Since 2010, MSBFs have ventured into 95 different emerging countries. The number of different emerging economies where the funds are invested in simultaneously (per quarter) has steadily risen from 46 at the end of 2009 to a maximum of 86 in 2018:Q2 -see Figure 5, panel 1. However, a small group of large EMs strongly dominates the investment recipients. The number one receiving economy alone represented, on average over the sample period, 19.4 percent of all EM MSBF fixed income assets (within a range of a minimum 15.2 percent and a maximum 26.1 percent), the top five countries accounted for 62 percent, and the top ten for 81.7 percent. Moreover, the widening of the sample of recipients is nearly all accounted for by hard currency debt, yet the vast majority of EM-issued debt held by MSBFs is in local currency (61 percent)- see Figure 5, panel 2.

Figure 5. Multi-Sector Bond Funds Portfolio Allocation

The recipient countries have steadily grown in number, but mostly in hard currency assets ...

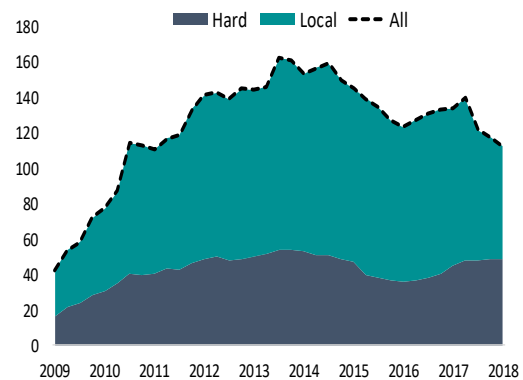
1. MSBF Fixed Income Portfolio by Currency: Number of Countries (Count)



Sources: Bloomberg Finance L.P.; and authors' calculations.

... yet the majority of EM assets held by MSBFs is local currency debt.

2. MSBF Fixed Income Portfolio by Currency: Outstanding Exposure (Billions of U.S. dollars)



Sources: Bloomberg Finance L.P.; and authors' calculations.

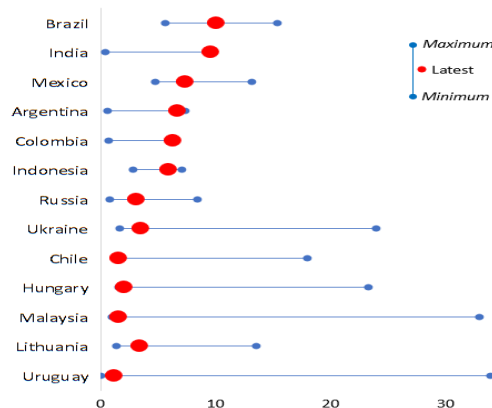
This suggests that the 'tried and tested' countries with more developed local rate markets receive local currency flows, but this is hardly the case for all EMs. So, while local currency debt markets have seen a burgeoning growth in the last decade, the exposure from large investors such as MSBFs has remained concentrated in a selected few. Unsurprisingly, when we consider the denomination of the currency of the debt, the dominance of a few large EMs in the aggregate

MSBF portfolio is even more pronounced. For local currency debt the top receiving economy, on average over the sample period, took in 24.6 percent of all EM local currency fixed income investment, but the top five countries accounted for 78.4 percent, and the top ten for 95 percent.³⁸ To get a better grasp of the concentration risk we consider MSBF exposures in EM sovereign bonds relative to the total foreign investor base in a given country (see heat map).³⁹ MSBFs own currently (2018:Q2) about 10 percent of the foreign investor base⁴⁰ in Brazil, Mexico and India (see Figure 6). Historically, however, there are sovereign bond markets such as Malaysia, Uruguay, Hungary, and Ukraine where these funds have owned over 20 percent of their foreign investor base in the sample period (2009:Q4–2018:Q2)- see Figures 6 and 7.

Figure 6. Multi-Sector Bond Funds Portfolio Concentration

MSBFs built up large exposures in the sovereign bonds of various key EMs.

MSBF Aggregate Country Holdings as a Share of Total Foreign Holdings of Government Debt (Percent)



Sources: Bloomberg L.P.; Arslanalp and Tsuda (2014 paper, 2019 dataset update); and authors' calculations.

Note: Minimum, maximum, and latest value reflect MSBF holdings (excluding equities and SOE holdings) as a share of the total foreign holdings of government debt in the respective country across the period 2009:Q4–2018:Q2.

The high concentration at the country level raises two main concerns (see also IMF, 2018a, 2018b):

1. First, these funds offer daily liquidity to investors while not adhering to an EM benchmark. As a result, faced with possible client redemptions that need to be paid for or portfolio reallocations more generally, the unwinding of these large positions may cause not only an increase in borrowing costs of specific sovereigns but also excessive market

³⁸ Hard currency EM debt in the aggregate MSBF portfolio (about 33 percent of total EM AUM) is somewhat less concentrated with the top economy receiving 14 percent, 50 percent by the top five countries and 70 percent by the top 10 countries.

³⁹ These figures correct for bonds issued by State-Owned Enterprises (SOEs) in the portfolio of MSBFs but may still contain small other corporate positions. Together with sovereign bonds, SOEs however are the main MSBFs holdings.

⁴⁰ As calculated in Arslanalp and Tsuda (2014 paper, 2019 dataset update).

volatility, posing further challenges to authorities in the conduct of macroeconomic and macroprudential policy.

2. Second, on the flipside, even when such funds turn out to be stickier—be it by choice or forced by low market liquidity,⁴¹—large concentrated positions in certain segments of the local sovereign bond market can render parts of the domestic yield curve illiquid and potentially impair monetary policy transmission. This further highlights the importance of MSBFs especially for relatively small and illiquid EM asset markets, and it shows one important mechanism for contagion. Although in some cases illiquid positions can provide stability in local markets, when forced to pay client redemptions, the most liquid positions in MSBF portfolios (e.g., Brazil or Mexico) could suffer pressure from asset sales to make up for the inability of MSBFs to exit illiquid positions (e.g., low-income countries).

While the reported concentration risk is already substantial in certain countries, these are still conservative estimates. This approximation is likely an underestimation of the risk and ‘true’ market importance of MSBFs for two key factors. First, estimates of the overall foreign investor base include also the foreign official sector besides foreign non-banks and foreign banks (see Arslanalp and Tsuda, 2014). The official sector is typically less sensitive to market dynamics, so the relative importance, or put differently, the marginal impact of changes in MSBF behavior in private markets could be much larger. Second, an important point that often is overlooked is that the data on public accounts of MSBFs underestimates the true extent of their exposures. That is, the reported regulatory data by MSBFs relates to their public or co-mingled (open-ended) funds in which fund managers have discretion over the underlying investments. MSBF families however do not just manage “discretionary” funds but are also responsible for so-called unregistered advisory (or “managed”) accounts, often run for large institutional investors. Although the ownership of the investments in these advisory accounts is in the hands of the client, these funds are often structured to replicate the portfolios of the asset manager’s discretionary fund.⁴² And therefore, any portfolio changes in the co-mingled discretionary funds are also likely to be replicated in the advisory mandates. The Office of Financial Research (2013) estimated that for the top 20 asset managers (by AUM) at the end of 2012 about 48 percent of their worldwide assets under management were held in unregistered accounts.⁴³

⁴¹ In contrast to the recent literature’s view of unstable global investment fund behavior, some early studies by Rea (1996), Rea and Marcis (1996) and Post and Millar (1998) on the investment dynamics of U.S. funds during the 1990s emerging market crises argue that market volatility was not exacerbated by end-investors or fund managers, and that mutual funds portfolio reallocations did not amplify price swings. Although it should be noted that these studies focused on equity funds and that the financial environment in which funds operate is very different today.

⁴² The clients for these unregistered accounts are typically large institutional investors (e.g., pension funds, insurance companies, sovereign wealth funds) that like the investment strategy/profile of a co-mingled fund, but that prefer to keep ownership over their assets (or underlying investments), and therefore avoid the impact of redemptions of other investors in the fund on the portfolio. For instance, in the global financial crisis investors with a longer-term horizon in some co-mingled funds were forced to take losses as investors with a shorter horizon ran for the exits and fund managers were forced to sell investments to raise liquidity. However, in an advisory account such forced selling can be avoided and the investors with a long-term horizon can hold on to depressed valued assets through the cycle.

⁴³ The report determines the worldwide registered Funds AUM by summing portfolio and investment data on each asset manager’s worldwide AUM and ETF AUM. Consequently, worldwide Unregistered Funds AUM is determined by subtracting worldwide Registered Funds AUM from total worldwide AUM.

Figure 7. Heatmap of MSBF Concentration in Selected EM Sovereign Debt

MSBF Holdings, as a Share of Total Foreign Holdings of Sovereign Debt																								
Date	Argentina	Brazil	Bulgaria	Chile	China	Colombia	Egypt	Hungary	India	Indonesia	Latvia	Lithuania	Malaysia	Mexico	Peru	Philippine:	Poland	Romania	Russia	S. Africa	Thailand	Turkey	Ukraine	Uruguay
2009Q4	1.27	5.70	0.08	8.14	0.36	0.65	5.12	1.61	0.48	4.09	0.00	8.36	11.32	4.78	0.62	0.47	5.16	0.00	0.76	4.13	1.82	1.39	1.66	0.00
2010Q1	0.97	5.69	0.07	8.84	0.43	0.96	4.51	2.09	0.44	4.44	0.00	10.43	13.54	5.82	0.59	0.42	5.98	0.00	1.42	5.15	1.57	1.65	2.94	0.00
2010Q2	0.91	5.59	0.07	12.67	0.44	0.95	4.57	2.18	0.49	4.70	0.00	11.19	13.75	5.86	0.64	0.43	6.21	0.00	1.83	4.86	0.21	1.58	2.78	0.00
2010Q3	0.84	6.14	0.16	10.14	0.82	1.18	4.41	2.82	0.90	4.89	0.00	10.23	16.92	7.11	0.77	0.39	6.19	0.00	2.25	4.58	0.15	1.75	3.62	0.00
2010Q4	0.73	5.87	0.21	10.03	0.93	0.99	5.48	3.33	0.90	4.74	0.00	9.98	18.07	6.07	1.01	0.83	6.38	0.00	2.93	4.81	0.33	1.82	4.37	0.00
2011Q1	0.86	6.90	0.20	17.92	1.10	1.07	6.87	4.97	0.90	4.72	0.00	9.82	17.92	6.34	0.96	1.73	6.80	0.38	3.52	5.29	0.29	1.42	6.07	0.00
2011Q2	0.84	6.86	0.15	17.68	1.37	0.91	10.85	6.62	1.05	4.90	1.51	13.55	32.91	5.30	1.41	3.74	9.64	2.79	4.39	5.12	0.33	1.39	8.05	0.01
2011Q3	0.77	7.10	0.08	14.06	1.08	0.87	13.04	10.71	0.98	4.88	1.74	13.14	30.26	7.17	1.42	4.44	10.57	2.88	4.24	5.13	0.05	1.12	11.42	0.01
2011Q4	0.90	6.79	0.08	13.72	1.13	0.69	16.73	11.67	0.94	5.00	1.69	12.54	24.11	7.19	2.39	4.48	10.49	2.85	4.18	4.98	0.05	1.57	12.31	0.01
2012Q1	0.88	5.95	0.07	15.84	1.07	0.76	14.20	13.11	0.93	4.82	2.34	11.46	24.17	7.44	2.62	3.61	11.18	2.98	5.54	4.51	0.04	1.35	12.25	0.01
2012Q2	0.66	7.55	0.07	9.52	0.82	0.85	12.02	14.45	0.92	4.36	2.60	12.43	24.60	8.86	2.47	3.55	10.08	2.76	5.07	4.00	0.04	1.60	13.18	0.01
2012Q3	0.84	7.73	0.17	10.40	0.82	0.73	9.74	15.24	1.07	3.97	2.98	12.41	24.43	11.06	2.58	3.14	10.74	2.73	8.46	3.24	0.34	1.63	14.44	0.55
2012Q4	0.79	7.95	0.17	8.58	0.84	0.82	6.79	16.21	0.95	3.92	3.00	12.35	24.58	10.60	2.77	4.56	9.63	2.72	8.02	2.13	0.37	2.34	19.05	8.01
2013Q1	0.77	7.29	0.05	8.16	0.94	0.92	5.42	17.45	0.97	4.26	2.77	12.39	24.06	9.95	2.58	3.89	8.08	2.43	7.68	2.98	0.36	2.63	19.40	8.73
2013Q2	0.77	7.89	0.06	8.42	0.52	1.41	5.62	18.48	0.94	3.43	2.58	11.77	25.61	8.74	2.21	4.33	8.87	2.28	6.50	2.45	0.78	2.09	19.28	8.65
2013Q3	0.74	7.99	0.06	8.35	0.50	1.45	3.13	19.43	0.96	2.87	2.88	12.01	27.88	9.63	2.35	6.13	8.43	2.25	6.28	2.01	0.69	0.96	22.39	7.56
2013Q4	1.10	6.70	0.00	7.61	0.68	1.79	1.96	20.11	1.01	2.78	1.49	11.37	24.86	9.59	2.31	6.43	8.71	2.29	5.77	2.17	0.54	0.93	23.16	8.50
2014Q1	0.63	6.60	0.00	8.44	0.71	1.71	2.03	19.55	1.16	3.15	1.91	10.77	26.47	8.61	2.54	4.89	8.35	2.34	5.23	3.16	0.20	1.12	23.95	25.88
2014Q2	0.68	9.24	0.00	9.99	1.15	1.50	1.98	20.86	1.20	3.07	1.43	6.71	22.97	11.78	2.63	4.65	7.91	0.37	4.72	2.79	0.21	1.46	20.46	23.15
2014Q3	0.59	9.90	0.00	9.97	1.14	1.36	2.01	21.37	2.91	2.89	1.37	6.65	21.71	10.82	2.47	4.52	9.46	0.39	4.91	2.18	0.28	1.17	17.53	33.87
2014Q4	0.56	8.66	0.20	9.01	1.68	1.10	2.20	23.26	5.59	3.10	1.20	6.31	22.94	10.08	2.60	4.45	9.32	0.43	6.39	2.16	0.28	1.44	12.19	23.26
2015Q1	0.62	10.38	0.00	9.40	1.28	1.13	2.75	23.22	6.32	4.25	1.59	3.91	21.74	11.18	2.38	4.82	9.49	0.29	6.08	2.54	0.34	1.64	7.69	19.38
2015Q2	0.67	10.50	0.00	8.58	1.25	0.91	2.58	21.29	6.03	4.79	1.15	3.88	19.70	12.19	2.73	4.67	8.23	0.28	2.84	2.67	0.23	1.65	9.41	19.80
2015Q3	0.58	10.48	0.00	7.42	0.99	0.80	2.73	18.50	5.79	4.97	1.11	3.92	21.10	13.11	2.27	4.50	7.65	0.26	2.57	3.25	0.26	1.52	14.17	16.33
2015Q4	0.58	12.53	0.00	7.32	1.12	1.06	2.53	15.51	5.46	5.91	0.44	3.58	18.08	12.45	2.12	4.65	5.68	0.56	3.18	3.13	0.25	1.61	15.06	17.51
2016Q1	0.98	14.48	0.00	3.16	1.04	2.05	2.15	4.68	6.00	7.08	0.42	2.31	15.41	12.43	2.01	4.70	3.68	0.35	2.59	2.38	0.29	1.49	14.58	12.97
2016Q2	1.57	13.60	0.00	3.37	1.00	5.05	2.61	3.16	6.02	6.91	0.40	2.53	10.85	11.56	2.05	5.16	3.86	0.27	3.07	2.59	0.22	1.40	14.80	10.83
2016Q3	2.62	13.13	0.00	3.63	0.90	5.61	2.92	2.99	6.00	6.93	0.83	1.34	9.51	10.76	2.09	5.07	3.58	0.27	2.93	2.61	0.55	1.38	12.02	8.36
2016Q4	5.01	13.78	0.00	4.42	0.86	5.54	2.45	2.98	5.97	6.62	0.99	1.44	9.54	9.90	2.01	5.11	2.11	0.24	3.74	3.73	0.59	1.60	12.63	8.36
2017Q1	6.06	15.40	0.00	3.50	0.92	6.28	2.71	2.85	8.17	6.54	0.05	1.97	1.03	10.08	1.91	4.11	1.31	0.27	4.10	3.96	0.63	1.63	7.93	1.72
2017Q2	6.48	14.80	0.00	2.85	0.83	6.18	2.41	1.65	9.19	6.76	0.05	1.71	1.29	10.72	1.85	3.57	1.15	0.37	4.29	5.14	0.96	2.20	5.20	0.67
2017Q3	6.51	14.74	0.00	2.32	0.75	6.01	2.37	1.70	8.76	6.76	0.05	1.53	1.36	9.43	2.61	3.18	1.23	0.39	4.59	5.24	1.08	2.47	5.70	0.78
2017Q4	6.88	13.78	0.00	1.93	0.81	5.80	2.43	1.65	9.40	6.66	0.12	1.50	1.20	9.56	3.28	3.09	1.18	0.37	4.35	4.88	1.14	2.68	3.01	1.09
2018Q1	7.34	12.95	0.00	1.41	1.04	6.22	2.42	1.55	9.23	6.26	0.19	2.92	1.57	9.78	4.02	2.95	1.42	0.43	2.97	5.26	1.37	3.04	3.55	1.25
2018Q2	6.61	9.99	0.00	1.49	0.97	6.17	3.12	1.99	9.47	5.79	0.34	3.26	1.45	7.29	3.78	2.78	1.43	0.45	2.96	3.14	1.50	2.33	3.37	1.08

Sources: Bloomberg Finance L.P.; authors' calculations; and sovereign foreign investor base estimates by Arslanalp and Tsuda (2014 paper, 2019 dataset update) which are provided in [Appendix 1](#).

Concentration in decision making

Decision-making is highly concentrated in MSBFs. Unlike dedicated bond funds, where the decision to invest in emerging markets rests with the end-investor, the portfolio managers of multi-sector bond funds are responsible for asset allocation decisions across fixed income sectors and geographies subject to their own particular investment mandates. Thus, the asset allocation decisions of a few fund managers could have a significant impact on markets (see also IMF 2014).

The broader fund family perspective can be used to assess concentration risk in the decision making of MSBFs. A fund family is defined as a group of funds that are managed and marketed together by the same investment fund company or asset manager. Christoffersen et al. (2014) discusses various aspects of “the family effect” and highlights that the many aspects that tie together a family of funds—company culture, investment advisors, traders, marketing campaigns, shareholder services, board members, etc.—could bind fund investment returns as well as their behavior. To assess the commonality of investment funds within a family in our sample we use the cross-correlations of the funds’ investment returns within the family as a proxy. There are eight fund families for which there is more than one of their funds included in our sample (together these eight families account for 26 of the 40 funds), with the largest two families accounting for eight and five funds, respectively. Meanwhile, there are 14 funds included in our sample that are the only fund of their wider family. Table 3 shows that the correlation of returns within the eight fund families is very high, implying there is an overlap (or co-movement) in their decision-making.

Table 3. Fund Family Average Fund Pair-wise Total Return Correlation

Family ID	Correlation Coefficient	Total Assets (bn \$, 18:Q2)	EM Bonds (bn \$, 18:Q2)	Asia	AFR	ECA	LAC	MENA
1	0.64	295.11	20.62	1.47	0.20	2.81	11.98	4.16
2	0.92	80.24	52.52	22.07	2.16	0.89	26.75	0.65
3	0.71	68.64	3.37	0.25	0.15	0.37	2.35	0.25
4	0.84	53.19	2.79	1.01	0.25	0.39	0.91	0.23
5	0.86	47.30	6.23	2.57	0.5	0.48	1.98	0.70
6	0.92	38.05	2.48	0.29	0.23	0.57	1.01	0.37
7	0.73	19.13	1.75	0.03	0.05	0.74	0.90	0.02
8	0.64	7.11	0.67	0.13	0.07	0.00	0.47	0.00
Agg. Family	0.78	608.77	90.42	27.81	3.62	6.25	46.35	6.39
All Funds	0.47	911.84	122.00	33.73	6.19	12.54	60.52	9.03

Sources: Bloomberg Finance L.P; and authors’ calculations.

Note: Correlations refer to average fund correlations within a fund family and are calculated based on quarterly total returns (in USD) over the period 2009Q4-2018Q2. AFR = Sub-Saharan Africa, ECA = Eastern Europe and Central Asia, LAC = Latin America and the Caribbean, MENA = Middle East and Northern Africa.

This correlated behavior is worrisome as the two largest asset managers own over \$70 billion in emerging market bond investments, or about 60 percent of all multi-sector bond funds in the sample. This high degree of concentration in decision-making contrasts with dedicated emerging market bond funds where there is also less activism, and a more even distribution of assets across fund manager groups (see Figure 8, panel 1). A single family of MSBFs is capable of accounting

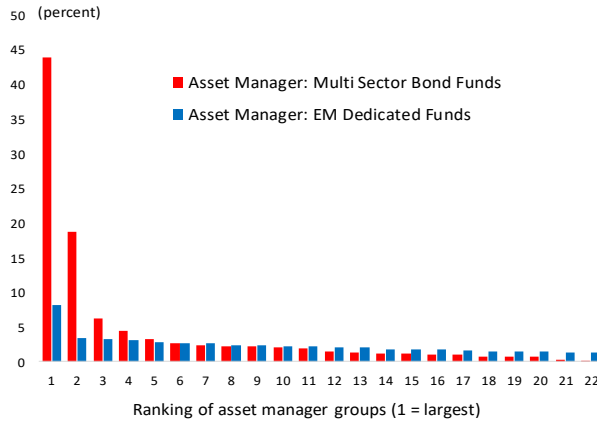
for a significant share of the foreign investor bases of some sovereigns (see Figure 8, panel 2). For this concentration to be truly worrisome not only a large size is needed but also the potential to exhibit an opportunistic and aggressive investment style, which we discuss in the following section.

Figure 8. Multi-Sector Bond Fund Concentration in Decision-Making

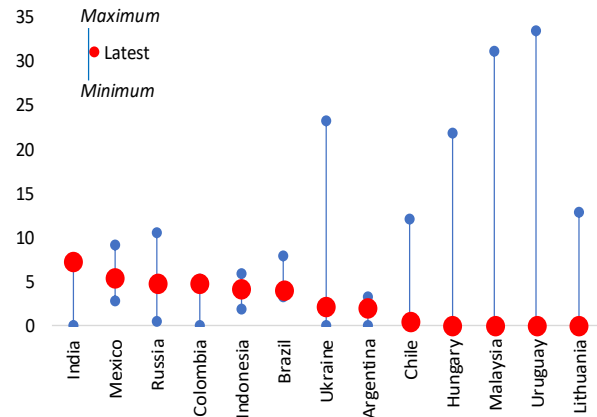
There is strong concentration amongst the largest managers of multi-sector bond funds relative to EM-dedicated bonds funds.

With a single family of funds capable of accounting for a significant share of some foreign investor bases of sovereigns.

1. EM Exposure of Single Asset Manager Group as a Share of Total Sector EM Exposure (Percent)



2. Top 1 Family of Funds Ownership of Foreign Holdings of EM Government Debt (Percent)



Sources: Bloomberg L.P.; EPFR Global; and authors' calculations.

Sources: Bloomberg L.P.; Arslanalp and Tsuda (2014 paper, 2019 dataset update); and authors' calculations. Note: Minimum, maximum, and latest value reflect MSBF fixed income holdings as a share of the total foreign holdings of government debt in the period 2009:Q4–2018:Q2.

Activism

How “benchmarked” do MSBFs behave? To quantify the degree of active management (i.e., deviation from benchmarks) this paper uses a method introduced by Cremers and Petajisto (2009) and applied by Miyajima and Shim (2014). The method determines the “Active Share” of a fund by comparing the holdings of a fund with the holdings of its benchmark index:⁴⁴

$$\text{Active Share} = \frac{1}{2} \sum_{i=1}^N |w_{fund,i} - w_{index,i}|$$

⁴⁴ An alternative metric used in the industry is the so-called ‘tracking error’. While the ‘tracking error’ and ‘active share’ are both aimed at determining how closely a portfolio follows the index to which it is benchmarked, the former is based on index and portfolio returns (i.e. prices), the latter is based on country weights. Given that this paper is mostly concerned with MSBF country allocations we opted to use the ‘active share’ metric because of its use of country shares.

Where $w_{fund;i}$ and $w_{index;i}$ are the portfolio weights of country i in the fund and in the index, and the sum is taken over all sample countries. For instance, for a fund with an active share of 20 percent this implies it tracks the benchmark by 80 percent.

To compute active fund shares, we use the market standard in EM benchmarks. The most widely followed EM indices among asset managers in the industry are the J.P. Morgan emerging markets debt indices. For government bonds in hard currency, this is the J.P. Morgan EMBI Global Diversified (EMBIG) Index, and for government bonds in local currency the J.P. Morgan GBI-EM Global Diversified Index. The EMBIG in 2018 covered 72 countries, while the GBI included 22 countries. The EM tradable debt universe, however, is considerably larger than what is implied by the J.P. Morgan indices. This is also reflected in the sample of MSBF portfolio flow recipient countries. Since 2010 there were 95 different emerging countries that received flows from MSBFs in at least one quarter, and at the end of 2018Q2 our MSBFs were positioned in 86 countries. To deal with the larger recipient country set in our MSBF sample, we create an “other” category that comprises the cumulative share of all countries not represented in the EM debt index (in the relevant index this other category thus always has a zero weight). Our data breaks down MSBF debt holdings by currency denomination. This allows us, first, to determine each fund’s diversion from the EMBIG (for its hard currency holdings) and from the GBI (for its local currency holdings).⁴⁵ Then, we calculate the active share for each fund as the weighted average of its benchmark diversions (with the weights determined by the currency breakdown per fund per period).

MSBF portfolios not only can move in size, but they typically deviate significantly from benchmarks. To get a true grasp of the degree of activism we calculate and compare active shares from MSBFs with those from EPFR dedicated emerging markets funds and EPFR global bond funds (that report country allocations). Figure 9 shows for each of the three groups the benchmark diversion metric. As expected, on average MSBFs are very active and do not adhere to the benchmark index. In contrast, EPFR EM-dedicated funds have a low active share, while EPFR global funds have a higher active share, although significantly lower than MSBFs.⁴⁶ This implies possibly more opportunistic (and potentially unstable) investments by MSBFs, as they more often rotate in and out of investments.

⁴⁵ The active share calculation is based on country shares within funds’ EM fixed income portfolio, rather than their overall portfolio, to get a like-for-like comparison with the EM benchmark index.

⁴⁶ The difference between the active share of MSBFs and EPFR global funds is still conservative as the benchmark diversion for EPFR Global funds (likely) has an upward bias. For MSBF, where we have exposure data by currency at the security level, we apply the appropriate benchmark for each fund in every country. However, for EPFR funds we face data limitations on the breakdown of debt holdings by currency, which complicates determining the appropriate benchmark. Therefore, we compute active shares based on both local and hard currency benchmarks and then take the minimum diversion per country to calculate the active share. Unavoidably, by using a single benchmark instead of two according to currency, there will be an upward bias to possible benchmark diversion. Although we minimize this bias by picking the ‘best’ index per country, the active share is larger. Our active share estimates for EPFR global and GEM funds, albeit somewhat higher, are well-aligned with similar estimates in the literature: Miyama and Shim (2014) find an avg. active share of 23.9 for global (mixed currency) EM bond funds, and 10.3 for regional dedicated EM bond funds.

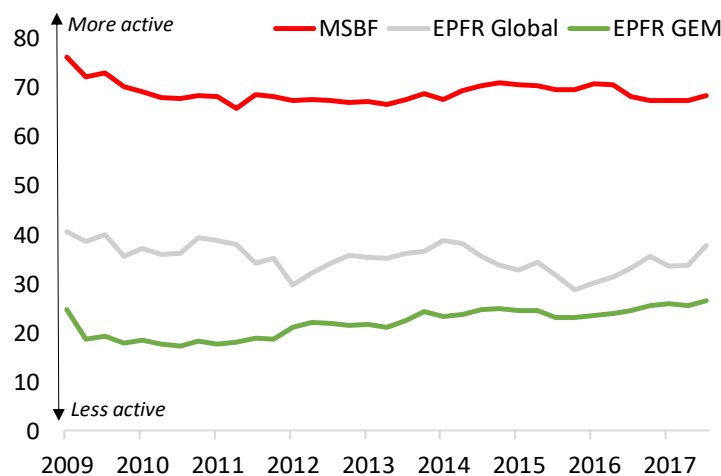
An important point in our analysis, however, is to assess how the degree of MSBF activism compares to other investment funds, especially EPFR global bond funds. So, even if the EPFR level should be interpreted with caution, the upward bias ensures we can be confident in the key takeaway of our results – MSBFs are significantly more active compared to peer groups.

In contrast to benchmark ‘huggers’, MSBFs are significantly less restricted in the portfolio allocations.⁴⁷ Asset managers that track benchmarks (individually) pose less positioning and volatility risk. The previous section detailed the highly concentrated positions in certain countries—even near historical highs in a few—and this should come as no surprise. The diversified indices limit the weights of countries with the largest market capitalization of their bond markets in favor of smaller countries to improve diversification.⁴⁸ As a result, the maximum weight of any country in the EMBIG has not exceeded 10 percent since 2009.⁴⁹ Meanwhile, MSBFs in their search for yield can be frequently overweight a certain region/country. In fact, the maximum EM country weight in our MSBF sample in any given quarter from 2009:Q4–2018:Q2 ranges between 15-26 percent, with a mean of about 19 percent. These highly concentrated positions raise volatility risks not just in the bond markets of those countries; sudden shifts in asset allocations of the multi-sector bond funds may amplify asset price co-movements across bond markets given the portfolio exposure of MSBFs in different fixed income markets.

Figure 9. Investment Fund Active Shares

MSBFs are opportunistic investors that deviate significantly from benchmarks.

Active Share
(Percent, based on EM fixed income portfolio)



Sources: Bloomberg Finance L.P.; EPFR Global; JPMorgan Chase & Co.; EMBIG; and authors' calculations.

Note: Active share quantifies the degree of active management. For instance, for a fund with an active share of 20 percent this implies it tracks the benchmark by 80 percent (Cremers and Petajisto, 2009).

⁴⁷ There exist regulatory standards for liquidity and portfolio concentration to prevent excessive mismatches between investment funds' assets and their redemption profiles. However, these limits are loosely and vaguely defined. This topic is further discussed in the Section VI on regulation and supervision.

⁴⁸ The weights of countries with larger debt stocks are limited by only including a specified portion of these countries' eligible current face amounts of debt outstanding.

⁴⁹ In earlier period when country coverage was more restricted, maximum weights were higher, but they have gradually come down and have not exceeded 15 percent since 1996. The maximum country weight in the GBI EM index at any time is capped at 10 percent.

MSBFs show significant volatility in the country weights in their portfolios. A high active share (on average) provides a snapshot, but if this deviation from the benchmark is stable so that country weights in the portfolio—even if not close to the benchmark—do not change much, this might not be all that worrisome. The allocation behavior of MSBFs, however, is characterized by often-changing country weights, sometimes in great leaps over a short time horizon. Figure 6 already alluded to this flexibility and suggests that country allocations/weight in the EM portfolio of MSBFs have been far from stable. However, [Appendix 2](#) provides a more detailed comparison of the average and standard deviation of country weights in the EM fixed income portfolio of the sample MSBFs versus the EMBIG benchmark index (from 2009Q4-2018Q2), for all countries in the EMBIG. This table shows that even though some countries in the index carry a larger weight (larger values are indicated with darker shades of gold vs. smaller values indicated with darker values of blue), there is very little volatility in these weights. In contrast, MSBFs, on average, have not only a larger country weight in key EMs, but this weight typically far exceeds the index. The contrast with the index is even more pronounced in the volatility of the weights, evidencing the dynamic allocation behavior of MSBFs.

Leverage and Contagion

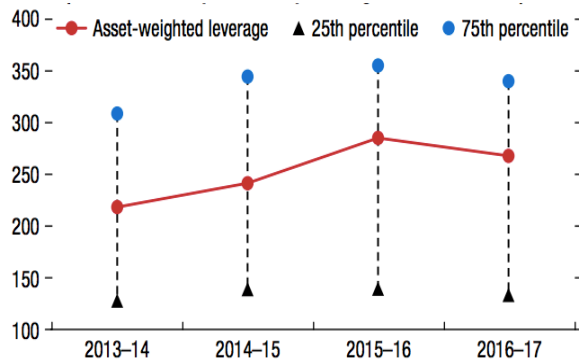
The potential risk of contagion may be exacerbated by the active use of derivatives with embedded leverage by MSBFs. Previous sections already highlighted the potential for contagion risk due to their large market footprint (~\$1 trillion, or about 10 percent of the entire bond investment fund sector globally). In combination with MSBFs broad mandates, this can lead to spillovers between otherwise unrelated sectors on the balance sheet. However, this contagion risk is still understated without taking into account the potential risks posed by their use of derivatives-embedded leverage (see Figure 10). Over 68 percent (AUM weighted) of the investment in emerging markets of our MSBFs sample is managed by funds that have leverage embedded in derivatives positions (measured as gross notional exposure) in the 90 percent to 850 percent range. Some investors may enter derivatives contracts to hedge unwanted risk. However, others may do so to boost returns, which, in turn, can amplify shocks during periods of stress (see IMF, 2018a). Even when some of this leverage is likely to be used for hedging, excess leverage in derivatives positions could further amplify the impact of losses from emerging market investments and their spillovers to other fixed-income exposures when managers have to unwind investments to meet redemptions. The lack of sufficient data collection and oversight by regulators compounds these risks. There are no disclosure requirements for detailed leverage information for regulated investment funds in place in the U.S., and requirements are in place only on a selected basis in some European countries. Implementing comprehensive and globally consistent reporting standards across the asset management industry would give regulators better data with which to locate leverage risks. For example, reporting standards should include enough information on derivatives to show funds' sensitivity to large moves in underlying rate and credit markets.

Figure 10. Leverage in Regulated Bond Funds

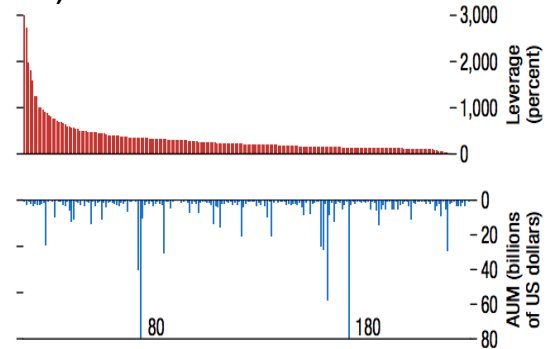
Gross notional exposures in large regulated bond funds that use derivatives were on the rise ...

... and often can exceed multiples of fund net asset values.

1. Average Derivatives Leverage of Selected Bond Funds (Gross notional exposure as a share of net asset value)



2. Derivatives Leverage and AUM across Different Funds (Gross notional exposure percentage; billions of U.S. dollars)



Sources: Bloomberg Finance L.P.; Federal Reserve; Financial Industry Regulatory Authority; ICE Bank of America Merrill Lynch; and authors' calculations. Note: Selected EU-domiciled investment funds report a gross notional exposure of their derivative positions in their annual report. Funds with reported leverage include the US-domiciled version of the same EU-domiciled funds that report leverage. Although these funds are separate investment vehicles, they share the same mandate and portfolio manager and therefore have closely matched portfolios, exhibiting a high correlation of returns. Further included is a group of selected funds that do not report leverage in derivatives positions but are known to be active in derivatives (the funds' latest annual reports list at least 15 derivatives positions).

IV. MARKET IMPACT

We explore whether MSBFs can be associated with significant changes in the price of underlying emerging market instruments. Large capital outflows from EM fixed income can increase bond yields and lead to a sharp depreciation of EM currencies. This increases the cost for EM borrowers to service their debt and exposes EM sovereigns as well as corporates to refinancing risks. Thus, the possibility that asset managers may destabilize EM asset markets is of relevance for policymakers.

A. Data

Bond funds. The sample comprises 40 large multi-sector bond funds (MSBFs), domiciled in the U.S. (24) and Europe (16), which are the largest regulated investment fund markets.⁵⁰ Their investment in EMs are calculated using individual fund bond filings available through

⁵⁰ In the U.S. so-called "Collective Investment Vehicles" (mutual funds, ETFs and closed-end funds) fall under the Investment Company Act of 1940, which applies to all investment companies apart from some exemptions (e.g., hedge funds). The key regulator is the Securities and Exchange Commission (SEC), to which mutual funds report a complete list of their holdings on a quarterly basis. In Europe, equivalent investment funds go by the name of "Undertakings for Collective Investment in Transferable Securities" (UCITS) and are regulated by a common EU legal and regulatory framework, the legislation (known as the UCITS Directive). They also have quarterly reporting requirements to their regulatory authority, which depends on the fund's chosen (EU) country of domicile.

Bloomberg’s Portfolio and Risk Analytics (“Port”) function.⁵¹ The sample considers MSBF holdings in 166 Emerging Markets and Developing Economies (EMDEs). This includes all IMF WEO EMDE countries, with the addition of some countries that are considered EMs in the EPFR database. It does not include territories or constituencies of developed economies. The specific country sample in the empirical analysis differs according to the panel regression specification, in particular the dependent variable. The sample includes funds with assets under management in excess of \$2.5 billion. There are eight funds that originate during the sample period. For these ‘new’ funds the assets in the initial quarters fall below the threshold (and their EM exposure is not included), but their assets typically quickly grow in excess of the size criterion. Of the already-existing funds there are nine funds that initially don’t meet the criterion but do so in the subsequent quarters. The remaining funds all comfortably meet the threshold, and 11 funds even enter the sample period with more than \$10 billion in AUM. It is of interest to note that, although we would permit funds to enter and exit the (unbalanced) panel in case they meet or fail the selection criteria⁵² and, while several funds experienced declines in their assets, there have been no funds that exited the sample once they entered it due to no longer meeting the materiality threshold.

Period. We cover the post-crisis period 2009Q4–2018Q2. The motivation for the start point is that MSBFs truly became large EM asset allocators in the post-crisis period, and various funds originated within this period as well. The endpoint was determined by the latest common period with available regulatory information on the portfolio allocation for all funds in the sample.

B. Methodology

The purpose of our empirical analysis is to explore whether there is evidence that changes in MSBF holdings in EMs can be associated with a significant market impact. That is, we are *not* trying to find the perfect model for predicting currencies, nor are we trying to find the perfect model for EM yield spreads. Accordingly, our model is kept parsimonious.⁵³ We estimate three-dimensional panel regressions with interaction effects. The two cross-section identifiers are

⁵¹ Some data cleaning is required to avoid outliers, and pricing errors identified in the PORT function. Unrealistic quarter-on-quarter (positive/negative) changes in the portfolio (either as market value or as a share of the total portfolio) are corrected. The adjustment depends on the root cause, for instance pricing errors vs. positioning errors, and corrects the market value of the underlying security using similar assets (e.g., the price dynamics of a sovereign bond with the same maturity) or similar positions (e.g., holdings of the same security in consecutive quarters).

⁵² This is to avoid survivorship bias. The issue of survival bias in mutual fund data is well known in the literature. Brown, Goetzmann, Ibbotson and Ross (1992) argued that survival biases in mutual fund data may cause spurious indications of performance persistence. Brown and Goetzmann (1995) use a sample of both surviving and failed mutual funds to determine the survivorship bias and show that poorly performing mutual funds are more likely to be terminated. To address the issue of survivorship bias, Carhart (1997) collected a mutual fund database free of survivorship bias that was the precursor of the commonly used CRSP SurvivorBias Free Mutual Fund Database. To eliminate the traditional survivorship-bias concerns, the database includes data from both active and inactive mutual funds (i.e., terminated through merger or liquidation).

⁵³ There are many benefits of using this parsimonious model specification (estimated without time-fixed effects), but at the same time this also makes it prone to potential endogeneity issues. For this reason, we are cautious to attribute causality and our estimation results are best interpreted as associative relationships.

(1) the multi-sector bond fund, (2) the country it is invested in. The third dimension is the time period. Our main regression is specified as follows:

$$y_{ijt} = x_{ijt}'\beta + \alpha_{ij} + u_{ijt}$$

, where the LHS is the dependent variable for fund i in country j at time t , x_{ijt}' is a vector of covariates, β is a vector of coefficients, α_{ij} are unobserved cross-section (fund-country) specific fixed effects⁵⁴ and u_{ijt} represents time variant unobservables. The covariates include an interaction term. The motivation for the interaction term in the model is to test the hypothesis that the relationship between changes in MSBF holdings and EM currencies/bonds is different in a risk-on environment (overall EM inflows) vs. a risk-off environment (overall EM outflows). The regressions account for cross-sectional dependence and heteroscedasticity.⁵⁵ The following variables (and expected signs) are included in the estimation:

- **Changes in MSBF Holdings** ($d\log(msbf)$)

EM holdings per fund per country are defined as the market value of the portfolio allocations at the end of each quarter adjusted for price changes. To adjust portfolio allocations for the changes solely due to the changes of portfolio assets' value, we assume – following the literature –⁵⁶ that the asset returns derived from price changes are approximated by country index returns (GBI for local currency and EMBIG for hard currency).⁵⁷ Taking the end-of-period allocations ensures that where there is a reporting lag, this influence is minimized (so: Q1: 3/31/20XX, Q2: 6/30/20XX, Q3: 9/30/20XX, Q4: 12/31/20XX). We use first difference log transformations of the (price-adjusted) dollar value to allow for a more intuitive interpretation. Furthermore, we differentiate between local currency holdings and hard currency holdings; the motivation is that changes in hard currency holdings should not, at least directly, impact the performance of the domestic currency, or local currency bonds. We expect a positive relationship between changes in (price-adjusted) MSBFs holdings and the dependent variable. That is, with larger MSBFs purchases (or sales) of assets, the domestic currency or bonds are expected to be associated with

⁵⁴ F-test between the pooled OLS and an (unrestricted) fixed effect model support panel fixed effects. We also conducted estimations including time-fixed effects as a robustness test. The inclusion of time-fixed effects, however, did not change materially the (signs or significance of) coefficients of our explanatory variables (results available on demand). At the same time, the time FE were broadly insignificant. Hence, we present the estimation results without.

⁵⁵ Standard errors and covariances in the panel regressions are estimated using a (degree-of-freedom corrected) variant of the Panel Corrected Standard Error methodology (Beck and Katz, 1995). The PSCE cross-section SUR method handles cross-section correlation (period clustering) by replacing the outer product of the cross-section residuals in the coefficient covariance estimator with an estimate of the (contemporaneous) cross-section residual covariance matrix.

⁵⁶ E.g., Brandao-Marques et al., 2015.

⁵⁷ The price-adjusted series is determined as follows:

- (1) Determine the QoQ growth rate in the market value of the MSBF position: $\Delta MV_{Q2-1} = ((MV_{Q2} / MV_{Q1}) - 1)$;
- (2) Subtract the QoQ return in the relevant index from the change in MV: $(\Delta MV_{Q2-1} - Ri_{Q2-1})$;
- (3) Apply the return-adjusted growth rate to the MV in Q1. Such that the price-adjusted MV in Q2 becomes:
 $MVQ2 = MVQ1 * (1 + (\Delta MV_{Q2-1} - Ri_{Q2-1}))$
- (4) Repeat in every quarter: $MVQ3 = MVQ2 * (1 + (\Delta MV_{Q3-2} - Ri_{Q3-2}))$; and so on.

outperformance or underperformance versus their EM benchmark, in particular, when these inflows or outflows are bigger than for the broader EM universe.⁵⁸

- **Performance Spreads**

Spreads are all expressed in percent over the relevant EM benchmark. A positive value indicates domestic outperformance compared to the benchmark, and vice versa for a negative value.

1. **Currency Spread (*CrncySP*)**
= (Quarter-on-quarter change in Local Currency vs. U.S. dollar) – (Quarter-on-quarter change in the J.P. Morgan Emerging Market Currency Index)
 2. **Local Currency Government Bond Index Spread (*GBISP*)**
= (Quarter-on-quarter change in domestic Local Currency Total Return Bond index) – (Quarter-on-quarter change in the Total Return overall J.P. Morgan Government Bond Index-Emerging Markets)
 3. **Hard Currency Government Bond Index Spread (*EMBIGSP*)**
= (Quarter-on-quarter change in domestic Hard Currency Total Return Bond index) – (Quarter-on-quarter change in Total Return overall J.P. Morgan Emerging Market Bond Index)
- Sources: Bloomberg, and J.P. Morgan.

- **Risk Appetite (*DRA*)**

We create a dummy variable that takes the value 1 in quarters when money is flowing into the EM space (risk-on), and 0 in periods of outflows (outflows). The values are determined using data on all dedicated EM Bond Funds (Local, Hard and Blend). Our prior is that in a period of EM portfolio inflows, the EM asset class as a whole performs well, so we expect a strongly positive relation between the dummy and the dependent variable. As mentioned, the risk appetite dummy is also included as an interaction term to test if the impact of a change in MSBF holdings on EM currencies/bonds is different in a risk-on environment compared with a risk-off environment.

In a so-called ‘risk-on’ environment, the effect of changes in MSBFs holdings is expected to be more moderate. For instance, MSBF outflows could weigh less on a currency/bonds as capital inflows from other institutions or investors can compensate for MSBF outflows; or, along the same reasoning, local outperformance due to MSBF inflows could be dampened as capital inflows boost the EM asset class as a whole. Meanwhile in a ‘risk-off’ environment, the effect of changes in MSBFs holdings is expected to be amplified. The impact of MSBF outflows could be exacerbated when all investors simultaneously are running for the exits, or inflows could lead to greater local outperformance when the EM benchmark is performing badly.

⁵⁸ MSBF holdings can include minor equity and corporate debt positions, but these are just a small part of the overall portfolio.

C. Estimation Results

Currencies. Table 4 Panel A. shows the regression results with the performance spread of the domestic currency over the EM benchmark as the dependent variable. The country sample is limited to (free) float currency regimes, as classified by the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).⁵⁹ By design, in fixed or other managed currency regimes portfolio changes will not (significantly) affect currency performance, and the inclusion of such regimes would bias our results. Similarly, changes in hard currency holdings are not expected to change domestic currency performance, so in panel A. the regressor for changes in MSBF holdings reflects only local currency positions.

The results confirm our priors. First, we find a positive (and significant) association between changes in MSBF holdings and currency performance. The positive sign can be interpreted as follows: As MSBF inflows in an emerging market rise by 1 percent, the currency of the recipient country will appreciate and outperform the EM currency benchmark by 1.09 percent. Second, and importantly, the impact of changes in MSBF holdings is amplified in periods of overall outflows from the emerging market universe. That is, while in a period of outflows (DRA=0) a 1 percent increase in MSBF inflows is associated with a 1.09 percent effect on the currency spread; in a period of EM inflows (DRA=1) this impact is moderated to just 0.44 percent. The MSBF marginal effect on local currency outperformance is lower because other investors are entering the domestic economy, as well as boosting the EM benchmark. The positive effect of broader EM inflows on the local currency is indicated by the positive dummy coefficient.

Local currency bonds. Table 4 Panel B shows the results with the performance spread of local currency bonds over the EM benchmark as the dependent variable. As before, the countries are restricted to a relevant sample, including only GBI countries (as there is no spread to define without inclusion in the index) in which MSBFs hold significant positions. Changes in hard currency holdings again are not expected to change local currency bond performance, so in panel B the regressor for changes in MSBF holdings reflects exclusively local currency positions.

As before, the results show the expected signs and are (statistically) significant. There is a positive relation between changes in MSBF holdings and local currency bond performance, which implies that an increase of MSBF inflows in an emerging country allocation of 1 percent is associated with an improvement in the performance of the bonds and leads to outperformance over the EM GBI benchmark by 1.23 percent. It is important also to take a nuanced view on when changes in MSBFs occur in the context of bonds. In a period of outflows (DRA=0) a 1 percent increase in MSBF inflows is associated with a 1.23 percent on the local currency bond spread; but in a period of inflows (DRA=1) this impact is moderated to 0.41 percent, following the same reasoning as before. The close results for the currency and local bond spreads should not surprise and suggests that fixed income investors in EM local currency bonds, in large part, make returns through changes in the value of their respective local currency. For instance, Hau

⁵⁹ Available online at: <https://www.elibrary-areaer.imf.org/Pages/Home.aspx>.

and Rey (2010) suggest that exchange-rate return is an important component of returns of international securities.⁶⁰

Importantly, the estimated coefficients are also economically significant. Looking at just declines in aggregate MSBF local currency holdings per country (i.e., 55 percent of the observations), a one percent decline is conservative. There have been several instances in our sample where MSBFs cut exposure to the bonds of sovereigns aggressively. The median decline in local currency fixed income exposure averaged across all funds over the country sample across the period 2009:Q4–2018:Q2 is about 8 percent, which translates into a quarterly 9.8 percent domestic currency underperformance (i.e., 1.2×8 percent) over the EM benchmark in a risk-off period (or a 3.2 percent underperformance in a risk-on period). Furthermore, about 12 percent of all quarterly declines occurred during a streak of two, or more consecutive quarters, highlighting that changes in MSBF portfolios could translate into potentially large negative cumulative effects.

Hard currency bonds. The same regressions were estimated to test the relation with the performance spread over the hard currency EM bond index and are presented in Table 4 Panel C. The sample here reflects EMBIG countries and changes in MSBFs holdings are in hard currency. Although the coefficients show the expected signs; unlike the previous regressions, the results are insignificant: with MSBFs inflows alongside broader EM outflows, a 1 percent increase in MSBF inflows is associated with an increase of 0.17 percent in the hard currency bond spread; meanwhile with MSBFs inflows alongside broader EM inflows the increase is moderated to just 0.02 percent in the hard currency bond spread. A potential explanation for the mostly insignificant results is that hard currency sovereign bond markets are often larger and more liquid than local currency bond markets. Active trading by MSBFs could therefore have less of an impact. The results also reflect the dominant focus of MSBFs on local currency EM fixed income, where their holdings account for almost two-thirds of their total EM investments (see Section III: Sample Characteristics: Snapshot).

In sum, our empirical results support the hypothesis that portfolio allocation decisions by MSBFs could be associated with significant price moves in the underlying bond markets they mostly trade (i.e., local currency fixed income). We found a robust positive association between changes in MSBF holdings and EM currency as well as local currency bond performance. However, it is important to take a nuanced view. It matters not just *who* is investing in EMs but also *when* they are investing. The results suggest that the marginal impact of MSBFs is still felt but mitigated in periods when investor risk appetite is high. Put differently, it is in a period of risk aversion that we are particularly concerned about MSBF risks. In a period of overall risk aversion (with no

⁶⁰ Earlier work highlighted the link between exchange rate dynamics and investor behavior (e.g., Froot and Ramadorai, 2005). Hau and Rey (2010), go beyond correlating exchange rate dynamics and aggregate order flows and study the dynamics in the international asset allocations of institutional investors. More specifically the authors investigate how international institutional investors adjust their risk exposure in response to changes in realized returns on their positions. Although the focus is on international equity funds, the paper documents fund level rebalancing behavior for changes in the foreign exchange risk component of the portfolio (as well as for changes in total equity risk in investor currency); i.e., when institutional investors' total portfolio risk increases (decreases) due to valuation effects, this coincides with active rebalancing which decreases (increases) the overall portfolio risk.

new cash coming in),⁶¹ investors pulling out, large redemptions to cover, and losses on the portfolio holdings (e.g., due to rising interest rates yields); fund managers of large MSBFs could face the ‘perfect storm’ of market conditions that may incentivize the need for aggressive asset reallocations from their often concentrated investment exposures in emerging markets.

Table 4. Estimation Results: Sensitivity of Currency and Bond Indices to Changes in MSBF Holdings

	Panel A. CrncySP		Panel B. GBISP		Panel C. EMBIGSP
dlog(msbf)	1.09 (0.31)	***	1.23 (0.34)	***	0.17 (0.19)
DRA	0.15 (0.39)		0.06 (0.32)		0.15 (0.10)
dlog(msbf) x DRA	-0.65 (0.38)	*	-0.82 (0.42)	*	-0.15 (0.22)
Obs.	3,528		3,297		15,080
R ²	0.178		0.144		0.053

Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: Panel regressions are estimated using quarterly data from 2009Q4 until 2018Q2. Estimations include fund-country fixed effects. Panel A. shows results for the performance spread vis-à-vis the EM benchmark of the domestic currency; panel B for the local currency bonds; and panel C for the hard currency bonds. Dlog(msbfs) is the first difference log of the EM holdings of MSBFs adjusted for the changes solely due to the changes of portfolio assets' value (local currency in panel A and B; hard currency in panel C), while DRA is a dummy variable for risk appetite that takes the value 0 in risk-off periods and 1 in risk-on periods. Standard errors are reported between brackets; ***, **, * indicate significance at the 1, 5 and 10 percent levels, respectively.

However, it is important to note, since the rise of MSBF funds in EM bond markets in recent years (or the sample period 2009–2018), their stability as EM investors remains in question, as they have yet to be tested by a large sector-wide shock.⁶² While we find evidence that large MSBF portfolio reallocations out of EMs can be associated with the underperformance of (local currency) markets, lack of an episode of systemic client redemptions (our outflows) from MSBFs implies that an econometric analysis of the available data might not (yet) be the tell-all story on the risks posed by MSBFs to EMs. Therefore, to further analyze the issue, in the next section we

⁶¹ Bond mutual fund managers have other ways to cover normal redemptions apart from selling bonds. For instance, fund managers tend to hold a share of the portfolio in cash (and cash equivalents such as short-dated bills) which can be readily used to pay for redemptions. This cash is also boosted from interest income from bonds held in the portfolio and proceeds from matured bonds; or cash from investment by new (or existing) investors in of fund shares on any given day. In normal market conditions, most redemptions can be covered by using these cash sources. In addition, fund managers have usually access to credit lines that can be used to pay for redemptions in exceptional circumstances.

⁶² By the time of publication, global financial markets were arguably facing a period of stress and systemic risk aversion due to the spread of Covid-19. Several MSBFs in our sample suffered large losses and a noticeable increase in redemptions in March 2020. At the time of writing, however, data on their asset allocation was not available due to the material lag with respect to when fund managers file this information with their respective regulators.

consider a case study of a single fund family in our sample with all the hallmark characteristics of a potential stability risk—large, opportunistic and active in EM, and facing large client redemptions—and the implications of its behavior. While this did not occur in an overall period of risk aversion and does not meet all our conditions of a “perfect storm,” this scenario could be indicative of the risks posed by large concentrated investments of MSBFs in EMs when funds with similar characteristics face the same conditions simultaneously.

V. CASE STUDY: WHEN A LARGE FUND MANAGER WITH CONCENTRATED INVESTMENTS IS FORCED TO RAISE LIQUIDITY TO PAY FOR CLIENT REDEMPTIONS

The largest fund manager invested in EM in the sample, which accounts for over 40 percent of the overall aggregate investment in emerging market bonds by MSBFs, suffered large client redemptions in the 2014:Q3 to 2016:Q4 period (see Figure 11). During this time, the assets under management of the five MSBFs in this family of funds almost halved, shrinking from a combined \$155 billion to \$82 billion.

A single family of funds can own a large share of the foreign investor base of some sovereigns. A specific single manager had a share exceeding 20 percent of the foreign investor base in the sovereign bonds of three countries (Uruguay, Malaysia and Hungary) as of 2014Q3.⁶³ However, these investments were significantly liquidated coinciding with a period when the MSBFs run by this manager suffered significant client redemptions.⁶⁴ Table 5 shows how much these exposures accounted for the aggregate EM portfolio of this family of funds. It also shows that, with the exception of Hungary, the majority of their investments were in local currency bonds. This indicates that, at least some of, the proceeds from these bond sales were likely to be used to pay for these redemptions.

⁶³ This single family of funds is the most significant contributor to Figure 8, panel 2 in Section III on concentration in decision making. This chart shows how this manager accounted for over 30 percent of the foreign holdings of Malaysian and Uruguayan sovereign debt at some point during the sample period.

⁶⁴ The literature review addressed interactions between behavior of end-investors, in which fund flows originate, and fund managers; and the risk of self-reinforcing (negative) feedback loops when they act in direct response to each other, or more or less concurrently. In regular times the frequency of review of EM allocation between end-investors and asset managers typically differs, as the former tend to review asset allocation on a quarterly basis often looking at the past history of return/ risk for the portfolio, while the latter tend to manage portfolios on a daily or intraday basis. However, during a crisis in an EM (or the EM asset class), such review and decisions to cut allocation could take place concurrently.

Table 5. MSBF Family Fixed Income Holdings

	Hard Currency			Local Currency			All currencies	
	Market Value		Position	Market Value		Position	Share of Foreign Holdings of Sovereign Debt	
	Percent of EM Portfolio		Change	Percent of EM Portfolio		Change	2014:Q3	2016:Q4
	2014:Q3	2016:Q4	(%)	2014:Q3	2016:Q4	(%)		
Hungary	5.60	0.03	-99.7	6.02	0.00	-100.0	20.32	0.05
Lithuania	0.80	0.00	-100.0	0.00	0.00	0.0	6.16	0.00
Malaysia	0.00	0.00	0.0	11.09	5.84	-53.4	21.20	8.72
Poland	0.48	0.00	-100.0	12.16	1.04	-92.2	8.99	0.60
Uruguay	0.00	0.00	0.0	5.01	1.74	-64.2	33.47	8.02

Sources: Bloomberg Finance L.P.; and authors' calculations.
 Note: 'Position change' excludes any changes due to price effects.

Large bond sales, when an investor has a concentrated position in the bonds of a particular issuer, could eventually have a negative impact on the returns of those securities (see also IMF, 2018b). Our panel regressions above showed statistically significant results whereby EM bond sales by multi-sector bond funds were associated with the underperformance of the currency and (local currency) bonds of a particular sovereign relative to a broader EM benchmark. The investment decisions of the largest fund manager in the sample, who liquidated several concentrated investments when facing heavy client redemptions in the 2014:Q3 to 2016:Q4 period, is likely to have contributed to the significance of these results. Indeed, most of the bonds of these sovereigns underperformed their benchmarks during this period. As Table 6 illustrates, only the local and hard currency bonds of Hungary performed better than the broader EM benchmark.⁶⁵ In all other cases, the bonds underperformed during the period when the asset manager suffered large redemptions.

⁶⁵ Hungarian domestic banks increased their share of their country's sovereign debt from 22 percent to 29 percent during the period, which also coincides with a similar decrease in the share of nonbank foreign investors from 36 percent to 29 percent (Arslanalp and Tsuda, 2014 paper, 2019 dataset update). This increase in the share of domestic banks was not mirrored in any of the other sovereigns in Table 6, indicating that the support from domestic banks may have contributed to the outperformance of Hungary's bonds during the period.

Table 6. Relative Performance of Selected Sovereign Bond Country Indices to Broad EM Benchmarks

	September 2014 – December 2016	
	Local Sovereign Bonds	Hard Sovereign Bonds
Hungary	+9%	+3%
Lithuania	<i>N/A</i>	-3%
Malaysia	-9%	-8%
Poland	-6%	-3%
Uruguay	-18%	-4%

Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: JP Morgan sovereign country indices are used as a proxy for the returns of sovereign bonds of each sovereign. The over/under performance is then calculated relative to the JP Morgan GBI_EM Global Diversified and EMBIG Diversified indices for local and hard currency returns, respectively.

When interpreting these numbers, it is important to put them in context. The largest asset manager in our sample suffered redemptions during a period when flows from emerging market dedicated bond funds were flat on aggregate and experienced moderate volatility (see Figure 11, panel 2). This may have provided the fund manager with a supportive environment when liquidating its bond investments, as they were likely to find some willing buyers for those securities. This is worrisome as it indicates that, despite benign market conditions, the asset allocation decisions of a family of funds could (potentially) be associated with the underperformance of a sovereign bond market. It would not be unreasonable to assume that the negative impact of the sale of these concentrated bond investments on their respective markets could have been much worse during a period of market stress when other emerging market investors are also likely to be experiencing outflows and therefore are forced sellers of securities.

Figure 11. Case Study

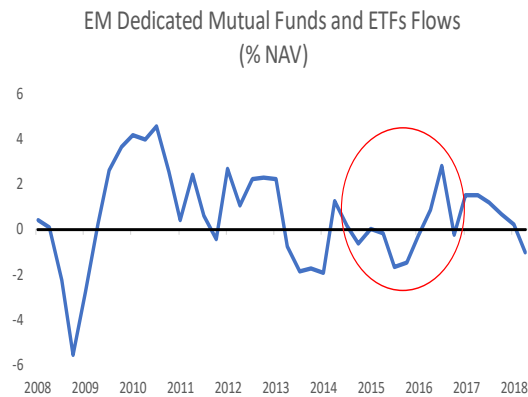
Large MSBF faced major redemptions starting end-2014 ...

1. Top Asset Manager Assets Under Management (Billions of U.S. dollars)



... BUT in a period when EM dedicated bond funds were flat and experienced moderate volatility.

2. EM Dedicated Investment Funds and ETF Flows (Percent of NAV)



Sources: Bloomberg Finance L.P.; EPFR Global; and author's calculations.

VI. POLICY RECOMMENDATIONS

Policymakers main concern with capital flows is to limit excessive volatility. There are different frameworks for dealing with capital flow volatility: ex-ante prevention, real-time monitoring and ex-post mitigation. In this section, we focus on recommendations to help prevent and monitor portfolio flow-related volatility due to MSBFs.⁶⁶

A. Prevention of Portfolio Flows Volatility: Debt Management Strategies

How much is too much? The main objective of public debt management is to ensure that the government's financing needs and its payment obligations are met at the lowest possible cost over the medium-to-long run, consistent with a prudent degree of risk.⁶⁷ This simple-sounding objective is operationally complex and involves difficult trade-offs. An in-depth discussion of the public debt manager's task is beyond the scope of this paper, but one aspect is highly relevant. That is, to what degree should the investor base be broadened by attracting foreign investors, and what is the ideal mix of different foreign investors to achieve the preferred portfolios of liabilities? There is no one-size-fit-all answer for all EMs, as the ideal mix will depend on the unique situation in every country—including its financing needs, risk appetite and discretion in setting issuance choices and other remits (to attract certain investors). However, in any situation it is important to acknowledge that while there may be benefits to be reaped from foreign institutional investor participation, there is a risk-reward tradeoff to be considered. If flows from one specific type of investor, say MSBFs, become relatively large compared with the domestic bond market, or other foreign investors, this can become problematic and complicate the task of EM policymakers.

At the heart of a prudent debt management strategy lays an understanding of the investor base. Foreign participation in EM debt markets involves many investor types, not just EM-dedicated, benchmarked funds but (as we have showed) increasingly also active and opportunistic MSBFs. Different types of investors have different characteristics (such as investment horizons, currency preferences, and allocation commitments) with different implications for liquidation and redemption risks, or return-seeking and herding behavior (Sienaert, 2012). From the public debt manager's perspective, the ideal lender is characterized by a long-term horizon (with no daily redeemability); stable, non-opportunistic/non-active behavior; and a narrow mandate. This profile appears antithetical to the archetype of a multi-sector bond fund. This does not mean MSBFs cannot be considered valuable investors as part of a balanced mix. On the contrary, by contributing to increase demand, domestic bond market development, and lower borrowing costs they are (likely) considered to be a net positive. What it implies is that the public debt manager should assess the desired share of MSBFs to achieve the preferred liabilities structure. Thus, **not take the investor base for granted, but rather take a preemptive approach through issuance choices and other remits in developing the**

⁶⁶ For a discussion on policy actions and regulations to mitigate volatile capital flows ex-post, the interested reader is referred to Ostry et al. (2010, 2011, 2012,) and IMF (2012, 2016).

⁶⁷ IMF public debt management guidelines, available online at: <https://www.imf.org/external/np/mae/pdebt/2000/eng/index.htm>

appropriate (country-specific) mix of MSBFs and other foreign investors—benchmarked funds, insurance and pension funds, banks and retail investors.⁶⁸

B. Warning Indicators

Global Financial Conditions in a Variable Rate Environment

Policy makers continuously monitor financial indicators for warning signals to identify and mitigate risks.⁶⁹ In the context of the foreign investment base, it is imperative to timely track changes in determinants of MSBFs portfolio debt flows to identify unsupportive market conditions. As evidenced in the capital flow literature, global push factors—outside of domestic policymakers’ direct control—are the dominant factor for portfolio debt flows.⁷⁰ One specific channel that has received a lot of attention in the academic literature is the effect of monetary policy changes in developed economies (see Fratzscher, et al., 2018; Burger, et al., 2018). If developed economy central bank liquidity becomes less supportive for EMs, or a hawkish surprise, or a faster than expected rising rate environment (for example, due to an inflation shock) occurs, this could trigger a “perfect storm”—a simultaneous occurrence of multi-sector bond fund section-wide losses, synchronized investor redemptions and fund manager reallocations away from EMs, during a period of overall EM risk aversion. So far, there has not (yet) been an instance where these factors occur together, but certain EM borrowers may be advised to take extra steps to prepare for a possible portfolio reallocation by MSBFs, and/or repricing of risky EM assets.⁷¹ To substantiate this warning, it serves to look at where MSBFs flows are originating. Looking at EM holdings by the domicile of MSBFs, the greatest marginal growth of EM exposure recently has come from European domiciled vehicles (see Figure 12, panel 1). European-domiciled vehicles have grown comparatively the most in their average EM portfolio allocation (see Figure 12, panel 2). So, while the U.S. Fed’s 2015–2019 tightening did not spark a sharp asset reallocation in the EM exposures of MSBFs; for some emerging economies the existing foreign investor base split may offer an explanation. A large share of MSBFs domiciled in the EU are possibly quite sensitive to the ECB, and by extension their EM

⁶⁸ Some determinants of foreign demand for domestic debt are beyond the direct control of debt managers (e.g., push factors), but some degree of influence can be exerted through issuance choices and other remits to attract different type of (foreign) investors. For instance, different cash flow characteristics (fixed coupon vs. floating rate, or nominal vs. indexed), maturities, currency denomination; etc. Thus, public debt managers can affect MSBFs participation, and are not powerless bystanders (see Udaibir et al., 2010; Sienaert, 2012).

⁶⁹ Such monitoring is a key component of robust macroprudential policy frameworks to mitigate systemic risk and improve the capacity and resilience of a financial system to safely intermediate cross-border flows. Capital flow management measures (CFMs) are not the only tool in policymakers toolkit; preemptively introducing macroprudential measures (MPMs), based on capital market indicators, can increase the resilience of the financial system to capital inflows, and MPMs may also assist, as long as buffers are in place, to deal with financial stresses from outflows (IMF, 2017). Yet, it serves to highlight that there are relatively few macroprudential tools for asset managers (IMF, 2018b).

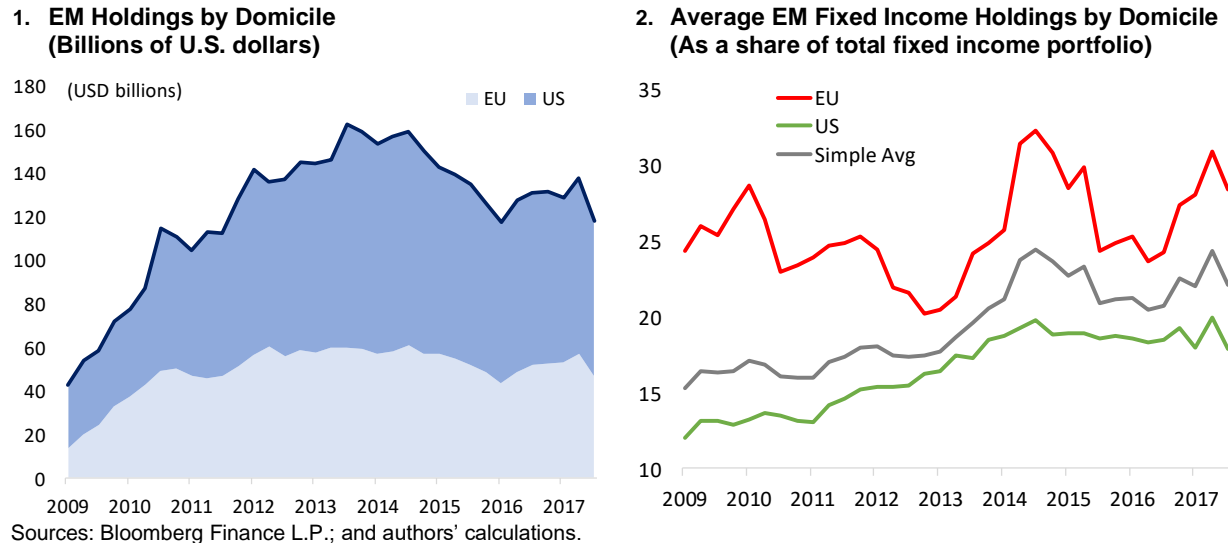
⁷⁰ In a recent paper Cerutti et al. (2015) show that countries relying more on international funds (e.g., mutual funds) and global banks for as foreign investors are significantly more sensitive to global push factors.

⁷¹ Cerutti et al. (2015) argue that the large heterogeneity to common dynamics (across countries and across different flow types) is explained by financial market characteristics, such as liquidity in the recipient country and composition of the foreign investor bases, rather than macroeconomic or institutional fundamentals. Although “good” fundamentals generally do seem to provide insulation against the effect of push factors; for portfolio bond inflows, the authors report ‘some’ statistically significant sensitivity for FX reserves, trade openness and the exchange rate regime.

portfolio debt inflows may be more sensitive to QE normalization by the ECB. ECB asset purchases temporarily ended in 2018 before restarting after the COVID-19 crisis in Q1 2020.

Figure 12. Multi-Sector Bond Funds Fixed Income Holdings: By Domicile

EU-domiciled vehicles comparatively have grown most in average EM portfolio allocation and could be potentially more sensitive to QE normalization by the ECB.



Regulation and Supervision of Leverage and Liquidity

The investment fund sector in the U.S. and EU is strongly regulated and subject to detailed investment and borrowing rules; yet there remain important weaknesses in the legislation.

First, the lack of sufficient data collection and oversight by regulators on leverage in MSBFs compounds potential risks. There are no disclosure requirements for detailed leverage information for regulated investment funds in place in the U.S., and although some requirements are in place on a selected basis in the EU, there is no EU harmonized reporting framework for UCITS.⁷² Implementing comprehensive and globally consistent reporting standards across the asset management industry would give regulators better data with which to locate leverage risks. For example, reporting standards should include enough information on derivatives to show funds' sensitivity to large moves in underlying rate and credit markets.

Second, better measures of liquidity should be designed and implemented to account for the risks posed by MSBFs, especially to address fund family concentration. Due to open-end investment funds' daily redeemability there exist some regulatory standards for liquidity and portfolio concentration to prevent excessive mismatches between investment fund assets and redemption profiles, but there is scope to improve and make the existing frameworks and

⁷² The European Systemic Risk Board (ESRB) published in February 2018 a recommendation on action to address systemic risks related to liquidity mismatches and the use of leverage in investment funds. (<https://www.esrb.europa.eu/news/pr/date/2018/html/esrb.pr180214.en.html>) But so far there are neither detailed regulatory guidelines nor meaningful market practices.

standards more specific. For some types of investment funds, there are fairly loose limits on concentration, as well as vague liquidity guidelines. However, it is key to highlight that neither UCITS Directives, nor the 1940 Investment Company Act have any specific constraints on the amount of a particular issue that a single fund family can hold. Moreover, the regulatory framework that does exist does not adequately account for concentration risks that can arise through the secondary market. Even though national debt managers typically aim to ensure sufficient diversification for placement of each sovereign issue in the primary market, concentration can still arise in the secondary market, by which MSBF can have a significant impact on local sovereign curves. Ideally, regulators could set limits on a fund family's investment in a country's total debt, i.e. cap primary and secondary exposure. However, such a measure would likely require global regulatory coordination, especially as it would be difficult from an EM issuer's perspective to this implement independently.

As of writing, UCITS-eligible funds are subject to a 10 percent limit on the amount that a portfolio can hold of a single issue; and, for the aggregate investment in which the UCITS fund invests, no more than 5 percent of the assets can exceed 40 percent of the value of the portfolio. In addition to the concentration limits under the EU UCITS Directive IV, UCITS must explicitly address liquidity risk in the portfolio, although the guidelines lack specificity.⁷³ In the U.S., the 1940 Investment Company Act states that, for 75 percent of the portfolio of a diversified fund, investment in a single issuer is limited to 5 percent of the value of the fund's total assets and 10 percent of the outstanding voting securities of the issuer (and therefore contrary to UCITS, there is no portfolio aggregation limit); for the remaining 25 percent of the fund's assets, there is no concentration limit and they can be invested in a single issuer. The U.S. regulatory guidelines do contain a liquidity standard that generally limits an open-end fund's aggregate holdings of "illiquid assets" to no more than 15 percent of the fund's net assets (the "15 percent guideline"),⁷⁴ but this guideline has arguably become more of a compliance exercise than a true constraint.⁷⁵ Further, there is no maximum limit that a single fund family can hold of particular securities, nor in the ownership of the outstanding bonds of a single issuer.

Even when there are no specific concentration limits for a fund-family portfolio in the regulatory framework, just from the perspective of prudent risk management, exposures on the fund-family basis of MSBFs could raise concerns. Consider a cautionary hypothetical concentration limit from the perspective of the issuer, such as an investment limit of 10 percent that a fund-family can own of a country's total debt outstanding (i.e., in the same spirit as UCITS but for a single issuer, instead of a single issue). Figure 13, panel 1 shows that one fund family exceeded or came close to this cautionary limit for multiple countries and for extended periods during 2010–2018. Alternatively, one could specify a hypothetical limit from the perspective of the total portfolio assets of a fund-family (i.e., in a similar spirit to the US investment act). Again, take a relatively loose investment limit of 10 percent that a single issuer can account for in the total value of the

⁷³ Regarding redeemability, key features involve that units of UCITS funds must be redeemable not less than twice a month; and investors must be allowed to redeem on "short" notice.

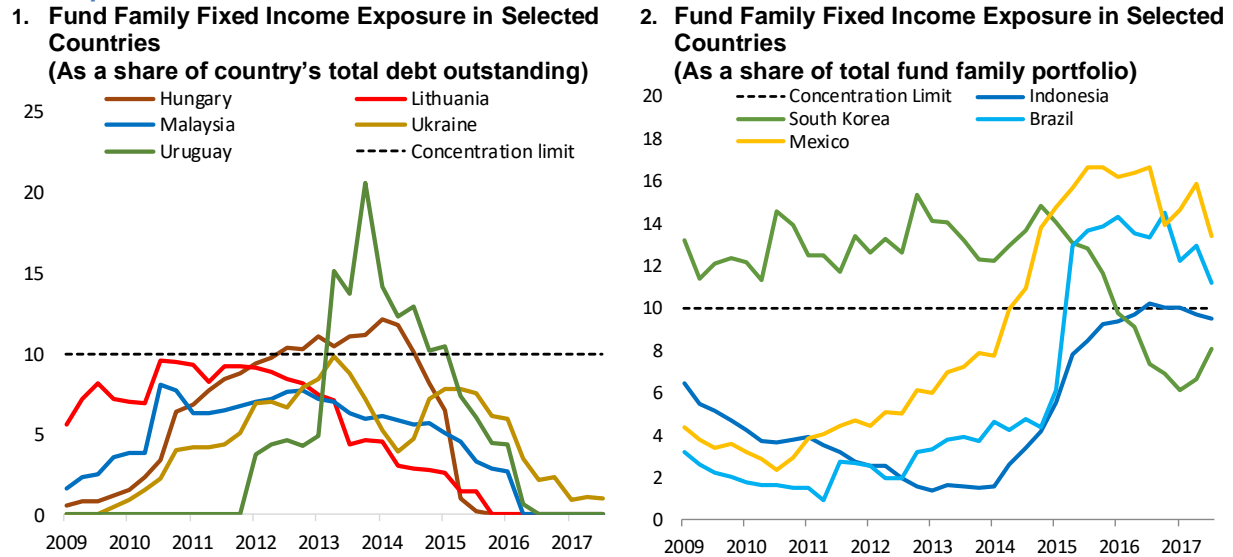
⁷⁴ See Revisions of Guidelines to Form N-1A, Investment Company Act Release No. 18612 (March 12, 1992).

⁷⁵ In the U.S., the existing framework further requires a once-a-day minimum redeemability that funds need to be able to fulfill within a seven-day requirement. In practice, the redemption occurs much more quickly than that. Also noteworthy, in October 2016, the SEC adopted a liquidity risk management program rule to further enhance funds' existing regulatory requirements (<https://www.sec.gov/rules/final/2016/33-10233.pdf>).

family of funds portfolio of assets. Figure 13, panel 2 shows, for the same fund family, that this hypothetical limit was exceeded for multiple countries.

Figure 13. Fund Family Breach of Cautionary Hypothetical Concentration Limit

A large family of funds has breached our (illustrative) concentration limit for multiple countries in the past.



VII. CONCLUSION

The evidence provided in this paper suggests that the large footprint of multi-sector bond funds (MSBFs) in emerging markets and their opportunistic nature may contribute to exacerbate periods of stress in emerging markets.

Unfortunately, research on these large investors is scarce and a systematic database is non-existent. Anecdotally these funds have not gone unnoticed, but risks of MSBFs in the empirical literature have remained in the dark. To shed light on the issue this paper presents a new database on 40 large key investment funds (domiciled in developed markets) that are positioned in emerging economies in the post-crisis period. The detailed nature of this bottom-up exercise allowed an analysis of their characterizing traits and revealed *why* it is important to address the omission of MSBFs from most of the existing literature. Our results show that MSBFs are increasing in size with a large footprint across major bond sectors. They are highly concentrated—both in their positions and in their decision-making. These funds exhibit opportunistic behavior and more so than other investment funds, often cutting exposure aggressively over a short time period. Moreover, MSBFs are among the most active users of derivatives with embedded leverage in the regulated investment fund sector. This makes them a potential risk for the stability of emerging markets' fixed income. In a parsimonious model we provide (economically and statistically) significant evidence of their potential to impact local currency emerging markets. Another key result suggests that it matters not just that they are investing in EMs but

also *when* they are (re)allocating. It is in a period of risk aversion that MSBF reallocations could be associated with a significant underperformance of selected emerging markets. In this context, it is important to highlight that the behavior of MSBFs has yet to be tested by a large sector-wide shock. While individual funds or in some isolated cases even fund families have faced large redemptions (as evidenced in our case study), this (fortunately) has not been accompanied by a period of stress and systemic risk aversion,⁷⁶ that could be exacerbated by possible opportunistic and aggressive portfolio management decisions—i.e., the ‘perfect storm’ of unstable market conditions.

It is therefore in policymakers’ interest to monitor the footprint of MSBFs in their local bond markets, and further research should be aimed at better understanding their behavior. There are a number of avenues for future research that follow from our findings. First, it merits taking MSBFs into account when analyzing the impact of international investment funds on capital flows. Second, our database could be expanded. Its complementary nature to the currently widely used datasets should also allow users of data services to expand and improve their cover of investment fund geographic allocations to EMs. Further, readily available representative samples of MSBFs should allow for analysis of the drivers of MSBF behavior. In our empirical work we remained agnostic on what drives MSBF asset allocation decisions. For instance, an exploration of the degree to which they respond to changing fundamentals could be helpful—e.g., are these investors amongst the first movers away from troubled economies, or conversely are they more reactive? Finally, our case study provided a salient example in which a large fund’s redemptions and consequent portfolio changes may be associated with the underperformance of the underlying assets; future work could investigate in a more formal event study not just the effect of such ‘reallocation events’ on security prices but also the duration of these effects.

⁷⁶ By the time of publication, global financial markets were arguably facing a period of stress and systemic risk aversion due to the spread of Covid-19. Several MSBFs in our sample suffered large losses and a noticeable increase in redemptions in March 2020. At the time of writing, data on their asset allocation, however, was not available as there is a material lag with respect to when fund managers file this information with their respective regulators.

Appendix 1. Total Foreign Holdings, as Percent of Total Sovereign Debt Securities

Date	Argentina	Brazil	Bulgaria	Chile	China	Colombia	Egypt	Hungary	India	Indonesia	Latvia	Lithuania	Malaysia	Mexico	Peru	PHL	Poland	Romania	Russia	S.Africa	Thailand	Turkey	Ukraine	Uruguay
2009Q4	26%	11%	55%	16%	2%	34%	18%	55%	6%	53%	68%	73%	17%	27%	61%	43%	37%	49%	22%	21%	5%	27%	58%	59%
2010Q1	25%	11%	56%	15%	2%	31%	20%	56%	6%	55%	70%	76%	20%	27%	61%	43%	38%	54%	21%	23%	5%	27%	54%	59%
2010Q2	26%	12%	55%	14%	2%	31%	21%	57%	6%	55%	73%	81%	23%	27%	62%	44%	40%	53%	24%	24%	6%	29%	56%	59%
2010Q3	27%	12%	50%	18%	2%	32%	23%	56%	6%	56%	73%	77%	24%	29%	66%	43%	42%	53%	22%	26%	7%	29%	57%	60%
2010Q4	30%	12%	49%	16%	2%	34%	22%	56%	6%	57%	69%	77%	25%	34%	67%	45%	42%	50%	19%	24%	8%	30%	58%	60%
2011Q1	29%	12%	48%	16%	2%	32%	19%	56%	6%	56%	69%	75%	25%	36%	67%	45%	43%	51%	18%	25%	8%	33%	58%	53%
2011Q2	29%	11%	47%	15%	2%	31%	18%	62%	6%	57%	72%	75%	27%	37%	67%	45%	45%	53%	17%	28%	9%	35%	57%	54%
2011Q3	28%	12%	47%	19%	2%	33%	16%	66%	6%	55%	71%	75%	28%	39%	68%	47%	48%	53%	17%	29%	10%	35%	57%	55%
2011Q4	28%	12%	44%	18%	2%	33%	14%	64%	7%	56%	73%	77%	29%	42%	68%	47%	47%	50%	16%	29%	11%	37%	55%	54%
2012Q1	28%	12%	43%	15%	1%	31%	13%	62%	6%	56%	76%	77%	29%	43%	70%	46%	47%	50%	16%	30%	11%	36%	52%	52%
2012Q2	28%	12%	43%	15%	1%	31%	13%	63%	7%	55%	77%	81%	30%	46%	71%	44%	49%	50%	19%	31%	12%	37%	48%	52%
2012Q3	26%	13%	47%	14%	1%	32%	12%	62%	6%	56%	76%	79%	31%	47%	70%	43%	50%	52%	20%	33%	14%	40%	51%	53%
2012Q4	26%	13%	50%	17%	1%	32%	12%	62%	6%	57%	75%	77%	32%	50%	69%	42%	51%	51%	20%	34%	15%	41%	51%	56%
2013Q1	26%	14%	48%	19%	1%	32%	12%	61%	6%	56%	76%	74%	33%	50%	68%	42%	51%	56%	23%	36%	16%	41%	49%	58%
2013Q2	26%	14%	47%	20%	1%	33%	13%	59%	6%	56%	75%	73%	33%	50%	68%	43%	50%	56%	22%	34%	18%	43%	46%	61%
2013Q3	25%	16%	49%	19%	2%	34%	13%	56%	6%	59%	75%	72%	30%	49%	68%	41%	50%	56%	24%	36%	17%	43%	45%	61%
2013Q4	25%	15%	48%	19%	2%	34%	12%	58%	6%	59%	75%	70%	31%	51%	65%	41%	49%	56%	21%	35%	17%	42%	46%	62%
2014Q1	28%	16%	46%	17%	2%	35%	12%	56%	6%	58%	80%	71%	29%	50%	62%	39%	55%	55%	20%	35%	16%	41%	49%	60%
2014Q2	32%	16%	43%	16%	2%	36%	11%	56%	6%	59%	81%	71%	30%	51%	61%	38%	56%	56%	20%	36%	16%	42%	51%	61%
2014Q3	31%	17%	50%	17%	2%	40%	11%	55%	6%	59%	81%	75%	30%	50%	59%	39%	55%	55%	20%	36%	17%	42%	48%	62%
2014Q4	29%	17%	52%	18%	2%	44%	9%	56%	7%	59%	78%	77%	29%	53%	58%	38%	55%	55%	18%	35%	18%	43%	51%	62%
2015Q1	28%	18%	52%	19%	3%	46%	9%	55%	6%	60%	73%	79%	29%	52%	58%	38%	54%	53%	15%	35%	17%	43%	60%	62%
2015Q2	28%	18%	49%	20%	3%	45%	9%	52%	6%	60%	69%	78%	31%	53%	56%	37%	54%	52%	16%	34%	16%	42%	59%	64%
2015Q3	26%	18%	48%	20%	2%	49%	8%	50%	6%	61%	71%	75%	29%	53%	58%	37%	54%	51%	17%	34%	16%	43%	60%	61%
2015Q4	28%	17%	47%	20%	3%	52%	8%	49%	6%	60%	70%	78%	31%	52%	59%	38%	54%	53%	16%	34%	14%	40%	61%	59%
2016Q1	26%	16%	49%	23%	2%	50%	9%	46%	6%	60%	69%	75%	33%	51%	59%	37%	50%	53%	16%	35%	14%	40%	63%	58%
2016Q2	34%	15%	49%	22%	2%	51%	8%	44%	6%	60%	70%	75%	35%	53%	58%	37%	51%	52%	17%	36%	15%	41%	60%	56%
2016Q3	33%	14%	48%	21%	3%	52%	8%	43%	6%	59%	71%	74%	36%	52%	61%	38%	51%	54%	19%	37%	15%	42%	61%	54%
2016Q4	38%	13%	49%	19%	3%	54%	15%	43%	6%	59%	70%	76%	33%	51%	59%	38%	51%	51%	17%	36%	15%	42%	57%	53%
2017Q1	41%	12%	48%	20%	2%	52%	19%	42%	6%	59%	73%	75%	27%	50%	58%	38%	50%	51%	19%	38%	15%	42%	56%	49%
2017Q2	41%	12%	47%	24%	3%	53%	22%	40%	6%	60%	73%	77%	27%	48%	63%	37%	50%	52%	19%	39%	16%	43%	56%	49%
2017Q3	43%	12%	47%	26%	3%	52%	26%	39%	6%	60%	73%	77%	28%	48%	63%	36%	50%	51%	22%	40%	16%	43%	57%	50%
2017Q4	42%	12%	45%	27%	3%	53%	26%	38%	6%	61%	69%	79%	29%	49%	61%	35%	49%	52%	22%	39%	15%	43%	57%	51%
2018Q1	47%	11%	46%	31%	3%	51%	29%	36%	6%	61%	72%	78%	28%	47%	58%	37%	48%	54%	24%	41%	15%	42%	56%	51%
2018Q2	48%	12%	46%	30%	4%	52%	28%	37%	6%	62%	78%	78%	26%	50%	59%	38%	47%	51%	22%	41%	15%	42%	55%	54%

Source: Sovereign foreign investor base estimates by Arslanalp and Tsuda (2014 paper, 2019 dataset update).

Appendix 2. Country Weights 2009:Q4 – 2018:Q2

Country	Average			Standard Deviation		
	EMBIG	GBI	Avg MSBF	EMBIG	GBI	Avg MSBF
	Hard	Local	AllCmncy	Hard	Local	AllCmncy
Algeria	0.00	NA	NA	0.00	NA	NA
Angola	0.24	NA	0.04	0.20	NA	0.06
Argentina	2.31	1.12	2.27	0.61	0.23	3.20
Armenia	0.12	NA	0.02	0.11	NA	0.02
Azerbaijan	0.50	NA	0.04	0.43	NA	0.04
Belarus	0.34	NA	0.10	0.22	NA	0.15
Belize	0.11	NA	0.00	0.04	NA	0.00
Bolivia	0.18	NA	0.00	0.15	NA	0.01
Brazil	5.37	10.00	19.24	1.67	0.00	11.48
Bulgaria	0.27	NA	0.02	0.28	NA	0.06
Cameroon	0.05	NA	0.01	0.08	NA	0.01
Chile	2.88	0.44	1.69	0.34	0.69	1.79
China	3.35	NA	3.08	0.72	NA	3.67
Colombia	3.89	5.51	1.33	0.61	1.55	1.39
Costa Rica	0.83	NA	0.17	0.67	NA	0.17
Croatia	1.87	NA	0.42	0.62	NA	0.57
Dominican Republic	1.35	NA	0.68	0.73	NA	0.68
Ecuador	0.72	NA	0.21	0.68	NA	0.41
Egypt	0.81	0.27	0.67	0.48	0.06	0.79
El Salvador	1.37	NA	0.46	0.22	NA	0.52
Ethiopia	0.13	NA	0.09	0.28	NA	0.12
Gabon	0.38	NA	0.03	0.09	NA	0.06
Georgia	0.27	NA	0.08	0.06	NA	0.05
Ghana	0.44	NA	0.35	0.14	NA	0.45
Guatemala	0.29	NA	0.05	0.20	NA	0.07
Honduras	0.17	NA	0.08	0.15	NA	0.10
Hungary	2.69	5.91	2.43	0.82	1.26	1.87
India	0.46	NA	2.34	0.38	NA	2.80
Indonesia	4.87	9.31	3.90	1.16	0.84	3.25
Iraq	0.87	NA	0.06	0.96	NA	0.06
Ivory Coast	0.72	NA	0.26	0.25	NA	0.46
Jamaica	0.60	NA	0.78	0.33	NA	0.58
Jordan	0.19	NA	0.02	0.15	NA	0.03
Kazakhstan	3.10	NA	0.60	0.32	NA	0.59
Kenya	0.28	NA	0.03	0.32	NA	0.05
Latvia	0.36	NA	0.08	0.37	NA	0.14
Lebanon	3.30	NA	0.11	0.46	NA	0.14
Lithuania	1.79	NA	0.25	0.53	NA	0.34
Malaysia	2.73	9.40	1.85	0.59	1.29	1.58
Mexico	5.61	9.99	18.70	0.89	0.06	11.74
Mongolia	0.37	NA	0.06	0.26	NA	0.10
Morocco	0.35	NA	0.15	0.28	NA	0.17
Mozambique	0.09	NA	0.01	0.09	NA	0.01
Namibia	0.15	NA	0.01	0.10	NA	0.02
Nigeria	0.33	1.63	0.15	0.25	0.43	0.29
Oman	0.38	NA	0.03	0.81	NA	0.07
Pakistan	0.63	NA	0.12	0.28	NA	0.08
Panama	2.89	NA	0.16	0.32	NA	0.18
Paraguay	0.25	NA	0.03	0.25	NA	0.04
Peru	3.31	2.01	0.66	0.29	0.32	0.83
Philippines	5.15	0.45	0.60	1.17	0.09	0.51
Poland	3.19	9.90	6.07	0.33	0.29	4.11
Romania	1.00	2.42	0.32	0.68	0.77	0.44
Russia	5.33	7.05	6.72	1.29	2.17	5.76
Senegal	0.20	NA	0.01	0.12	NA	0.03
Serbia	1.01	NA	0.38	0.44	NA	0.35
Slovakia	0.22	NA	0.04	0.21	NA	0.07
South Africa	3.13	9.73	3.46	0.30	0.55	3.89
South Korea	0.00	NA	6.60	0.00	NA	5.08
Sri Lanka	1.42	NA	0.29	0.55	NA	0.34
Suriname	0.02	NA	NA	0.04	NA	NA
Tanzania	0.07	NA	0.00	0.08	NA	0.00
Thailand	0.00	8.16	0.17	0.00	1.04	0.25
Trinidad & Tobago	0.29	NA	0.03	0.27	NA	0.07
Tunisia	0.13	NA	0.01	0.13	NA	0.02
Turkey	5.28	9.55	1.87	1.17	0.83	1.75
Ukraine	2.69	NA	0.91	0.54	NA	0.81
Uruguay	2.30	0.24	0.38	0.26	0.05	0.43
Venezuela	3.12	NA	1.22	1.17	NA	1.31
Vietnam	0.55	NA	0.08	0.14	NA	0.10
Zambia	0.31	NA	0.22	0.27	NA	0.29
Other	0.00	NA	6.68	0.00	NA	0.37

Sources: Bloomberg Finance L.P.; and authors' calculations.

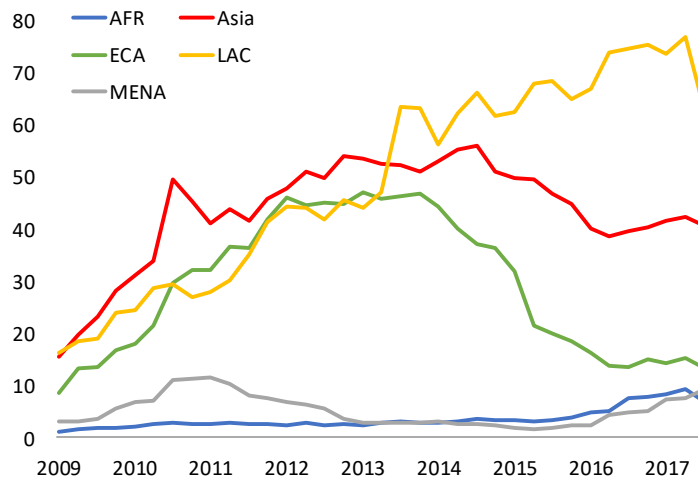
Note: The average MSBF country weight is determined as (1) the average country weight per fund (across periods) in the fund's EM portfolio (which allows for a like-for-like comparison with the indices); (2) averaged across all 40 funds.

The MSBF country weight standard deviation is similarly obtained and indicates for a large (small) standard deviation that the country weight for the 40 MSBFs across the sample period is far away from (close to) the mean country weight, on average.

Appendix 3. Description of MSBF EM Portfolio Holdings

Portfolio Holdings. The EM investment database of multi-sector bond funds, determined from Bloomberg’s Portfolio and Risk Analytics (“Port”) function, is created bottom-up using fund-by-fund regulatory filings. Therefore, the data according to our best knowledge, should provide a good approximation of the country-level portfolio weights for EMs allocated by foreign MSBFs. The sample considers 166 Emerging Markets and Developing Economies (EMDEs), comprised of all IMF WEO EMDE countries, with the addition of some countries that are considered EMs in the EPFR database. It excludes territories or constituencies of developed economies. MSBFs hold positions in all EM regions, but Latin American and Asian countries have (increasingly) championed the asset class after the global financial crisis. This is likely explained by their more liquid and developed financial markets; although this is as far as the likeness of their investment propositions goes—one region is commodity-export reliant and has experienced an increase in political uncertainty, while the other relies on manufacturing exports and has experienced greater macroeconomic and political stability. Eastern European countries lost some of their attractiveness in the wake of the 2011–2012 European Sovereign Debt Crisis, and many countries went through a period of deleveraging to reduce high debt built up in the pre-crisis years. The region also saw significant outflows when the ECB started its QE program in 2015. Meanwhile African and Middle Eastern countries have received comparatively fewer flows across the sample horizon.

Appendix 3, Figure 1. Multi-Sector Bond Fund Holdings: By Region (Billions U.S. dollars)

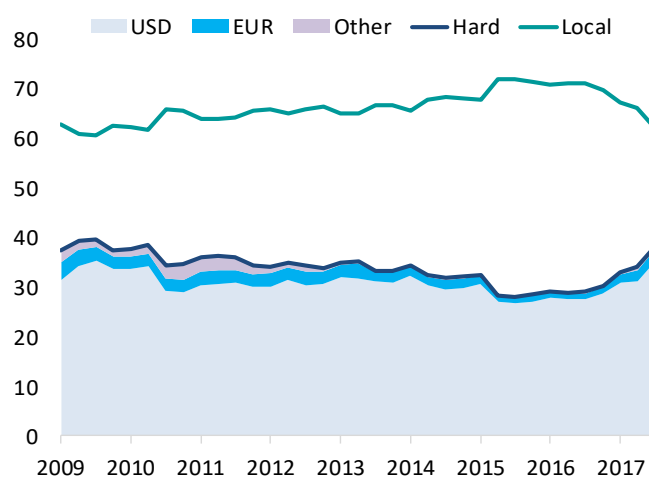


Sources: Bloomberg Finance L.P.; and authors’ calculations.

Starting from the lowest level of granularity with detailed portfolio holdings by each individual fund not only increases the statistical power due to the large cross-section of individual funds, but it also allows us to verify very specific hypotheses. For instance, does the currency denomination matter for the impact of our variables of interest? Unsurprisingly, this distinction is non-trivial. As the average MSBF portfolio showed, the large majority of MSBF EM holdings is held in local currency, amounting to about two-thirds percent of all EM investments by MSBFs.

Appendix 3, Figure 2 shows the evolution over time of the aggregate MSBF EM holdings by currency. Local currency debt has (mildly) trended upward until early-2016 and increased its relative dominance vis-à-vis hard currency assets. The ratio then stabilizes, only to drop around mid-2017 (less local, more hard currency), and this trend has continued ever since (although local currency debt still outweighs hard-currency debt by a factor of 1.5). The hard currency holdings on MSBF balance sheets are nearly all in U.S. dollar, with some euro positions, other hard currencies combined barely stand out.⁷⁷

Appendix 3, Figure 2. Multi-Sector Bond Fund Holdings: By Currency (Percent)



Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: "Other" hard currencies include: GBP, JPY, CHF, AUD, CAD, SGD, DKK, NOK, NZD, and SEK.

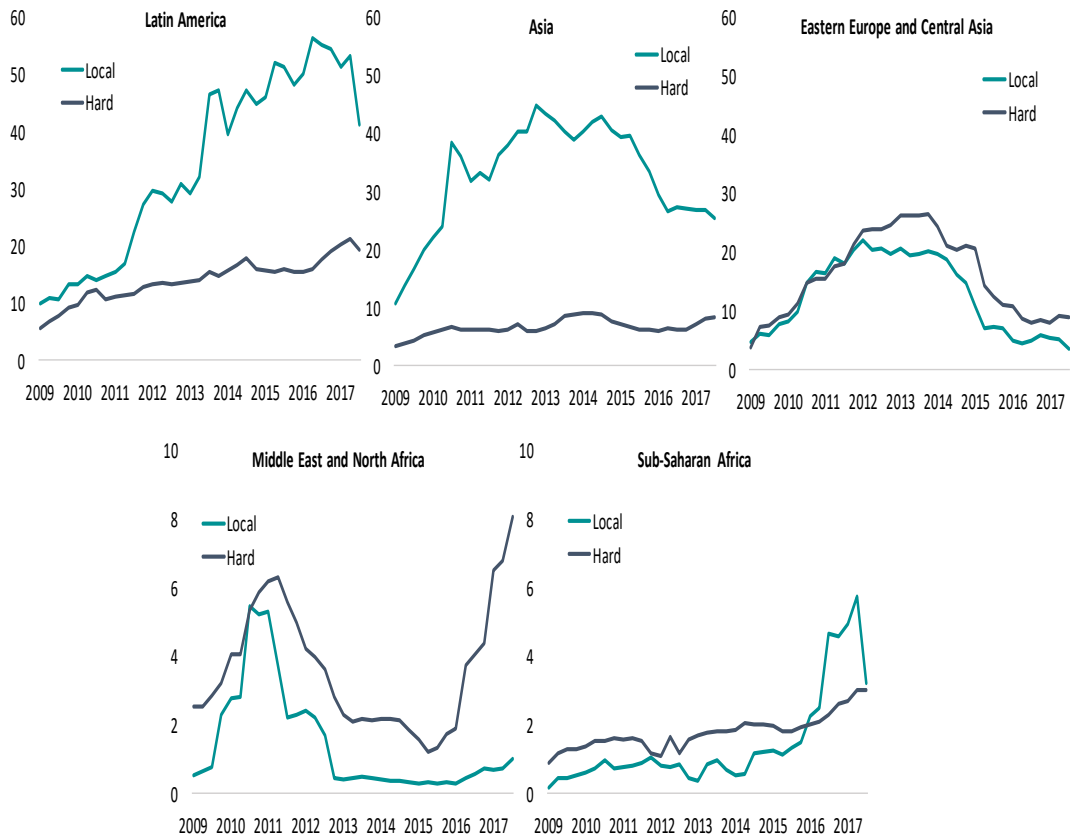
Further disaggregating the portfolio dynamics by currency into different regions clearly shows that, while local currency debt markets have been a growing source of financing for EMs, this has been an uneven development in our sample.⁷⁸ Latin American and Asian local currency debt held by MSBFs not only dwarfs the local currency debt held from other regions (mind the scale in the picture); but it is only in these top two regions that countries have had the "luxury" of financing more in local, than in hard currency. The Middle East and North Africa (MENA), and Sub-Saharan Africa (AFR) have received comparatively fewer flows across the sample horizon. In MENA there has been a noteworthy surge in dollar-debt since end-2016, as various countries (Qatar, Saudi Arabia, UAE) debuted global bond markets with record deals. Similarly, AFR debt

⁷⁷ "Other" hard currencies include GBP, JPY, CHF, AUD, CAD, SGD, DKK, NOK, NZD, SEK. Combined the holdings in other hard currencies make up a (marginal) avg. of ~1% of all EM holdings over the whole sample period (equivalent to an avg. 2.9% of all hard currency EM holdings over the sample period).

⁷⁸ The development of local currency debt markets has been very heterogeneous not only *between* but also *within* regions, with just a few large emerging countries accounting for the lion's share. For instance, in Latin America (about 33% of all local currency fixed income debt on average over the sample), Brazil (15%) and Mexico (14%) alone account for most local currency debt. Meanwhile in Asia (32%), South Korea (14%), Indonesia (7%), and Malaysia (5.6%) champion the region's local currency debt markets.

markets have been thriving (e.g., Nigeria, Ghana, Kenya, and Ivory Coast) and MSBF participation in local currency debt has risen rapidly, albeit from low levels. Caution seems warranted as the final sample quarters in various regions (note Africa) already show early signs of an acceleration in outflows.

Appendix 3, Figure 3. Multi-Sector Bond Fund Regional Fixed Income: By Currency



Sources: Bloomberg Finance L.P.; and authors' calculations.

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