



MONETARY AND CAPITAL MARKETS

Global Financial Stability Notes **Multi-Sector Bond Funds in Emerging Markets—Easy Come, Easy Go**

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Unconstrained multi-sector bond funds (MSBFs) can be a source of spillovers to emerging markets and potentially exert a sizable impact on cross-border flows. MSBFs have grown their investment in emerging markets in recent years and are highly concentrated—both in their positions and their decision-making. They typically also exhibit opportunistic behavior much more so than other investment funds. Theoretically, their size, multisector mandate, and unconstrained nature allows MSBFs to be a source of financial stability in periods of wide-spread market turmoil while others sell at fire-sale prices. However, this note, building on the analysis of Cortes and Sanfilippo (2020) and incorporating data around the COVID-19 crisis, finds that MSBFs could have contributed to increase market stress in selected emerging markets. When faced with large investor redemptions during the crisis, our sample of MSBFs chose to rebalance their portfolios in a concentrated manner, raising a large proportion of cash in a few specific local currency bond markets. This may have contributed to exacerbating the relative underperformance of these local currency bond markets to broader emerging market indices.

PORTFOLIO DYNAMICS—SIZE AND CONCENTRATION ¹

Prior to the COVID-19 pandemic, emerging economies increasingly saw portfolio debt inflows from a type of large international investment fund: multi-sector bond funds (MSBFs). The assets of the funds in a sample of 40 large MSBFs have more than doubled since the global financial crisis to about \$1 trillion (nearly 10 percent of the entire bond investment fund sector globally). Their aggregate emerging market investment has ranged between \$100 billion–\$160 billion in recent years (peaking at about \$160 billion in 2014), with the bulk of their emerging market exposure invested in sovereign bonds and—to a much lesser extent—bonds of state-owned enterprises. Since MSBFs are unconstrained by benchmarks, they are highly concentrated, both in their positions and their decision-making; exhibit a significantly more opportunistic behavior than other investment funds; and actively use derivatives and leverage. More than two-thirds of the investment in emerging markets

¹ The authors are grateful for the useful comments and contributions from Antonio Garcia Pascual.

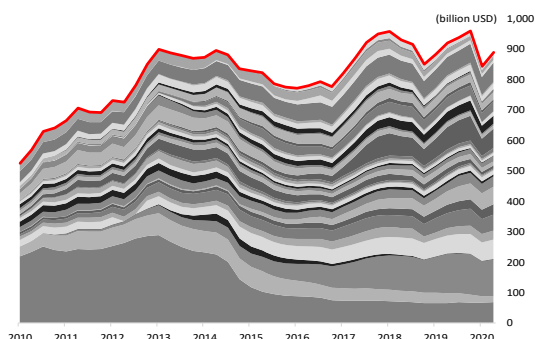
from the MSBFs sample is managed by funds that have leverage embedded into derivatives positions. While some MSBFs use derivatives for hedging, others can use it to boost returns. Unlike dedicated bond funds, where the decision to invest in emerging markets rests with the end investor, MSBF portfolio managers are responsible for asset allocation decisions across fixed income sectors and geographies subject to their own particular investment mandates.

Figure 1. Multi-Sector Bond Funds: Size and Emerging Market Exposure

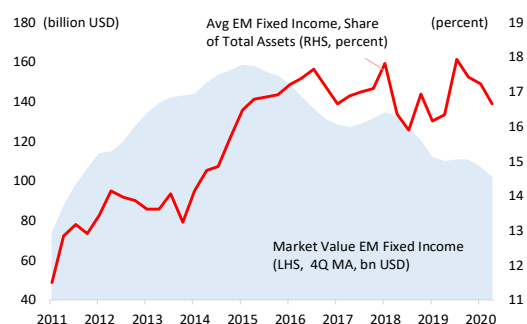
There has been strong growth in the assets of multi-sector bond funds ...

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

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



2. MSBFs Total Emerging Market Fixed Income Exposure (Percent, billions of US dollars)



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

Note: The sample comprises 40 large MSBFs, domiciled in the United States and Europe from the fourth quarter of 2009 to the second quarter of 2020. In panel 2, total fixed income includes local and foreign currency holdings. EM = emerging market; LHS = left-hand scale; MA = moving average; MSBF = multi-sector bond fund; RHS = right-hand scale; USD = US dollar.

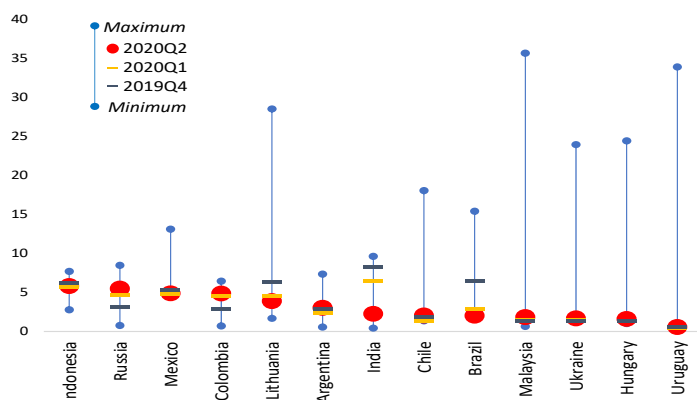
MSBFs built up large exposures in the sovereign bonds of various key emerging markets but recently shed exposure close to historic lows, which accelerated since the COVID-19 outbreak. Over the past decade, the sample of 40 MSBFs alone have accounted for more than 20 percent of the foreign investor base of sovereign bond markets, such as Hungary, Malaysia, Ukraine, and Uruguay. More recently, they have exceeded 10 percent of the foreign investor base in Brazil, India, and Mexico (see Figure 2).² MSBFs reached historical lows in their investment concentration in many emerging markets following the COVID-19 crisis (as of the second quarter of 2020) as they rebalanced their portfolios into safer assets and sold positions in response to redemptions. Worryingly, a few selected emerging markets—Brazil and India, in particular—suffered the brunt of the portfolio rebalancing, which likely exerted additional price pressure on those markets. Incidentally, their local bond markets and currencies underperformed in broader emerging market indices during this period.

² These arguably are still conservative estimates. Public accounts of MSBFs likely underestimate the true extent of their exposures. 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. Moreover, the estimated foreign investor base also includes the foreign official sector, in addition to nonbanks and banks (see Arslanalp and Tsuda 2014). The former is typically less sensitive to market dynamics, so the relative importance, or put differently, the marginal market impact, of changes in MSBF behavior could be much larger than implied by exposure estimates.

Figure 2. MSBFs: Concentrated Emerging Market Exposures

MSBFs built up large exposures in the sovereign bonds of major emerging markets but shed exposure to historic lows after the COVID-19 pandemic

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



Sources: Bloomberg L.P.; Arslanalp and Tsuda (2014 paper, 2020 dataset update); and authors' calculations.

Note: Minimum, maximum, 2018:Q2 and 2020:Q2 reflect MSBF holdings (excluding equities and state-owned enterprise) as a share of the total foreign holdings of government debt in the respective country from the fourth quarter of 2009 to the second quarter of 2020. MSBF = multi-sector bond fund.

BENCHMARK DIVERSION AND RISKS

MSBF portfolios not only can move in size, but they typically deviate significantly from benchmarks. The analysis on activism in Cortes and Sanfilippo (2020), which covered the period from the fourth quarter of 2009 to the second quarter of 2018, showed that during “normal” times, MSBFs not only have an absolutely high degree of activism³ (with the median active share exceeding 70 percent,) but compared to benchmark-driven investors (BDIs) and emerging market economy funds—proxied by Emerging Portfolio Fund Research Inc.’s (EPFR) global bond funds and EPFR-dedicated emerging markets funds that report country allocations, respectively, that have an *active share* below 20 percent. This implies possibly more opportunistic (and potentially unstable) investments by MSBFs, as they more often rotate in and out of investments.

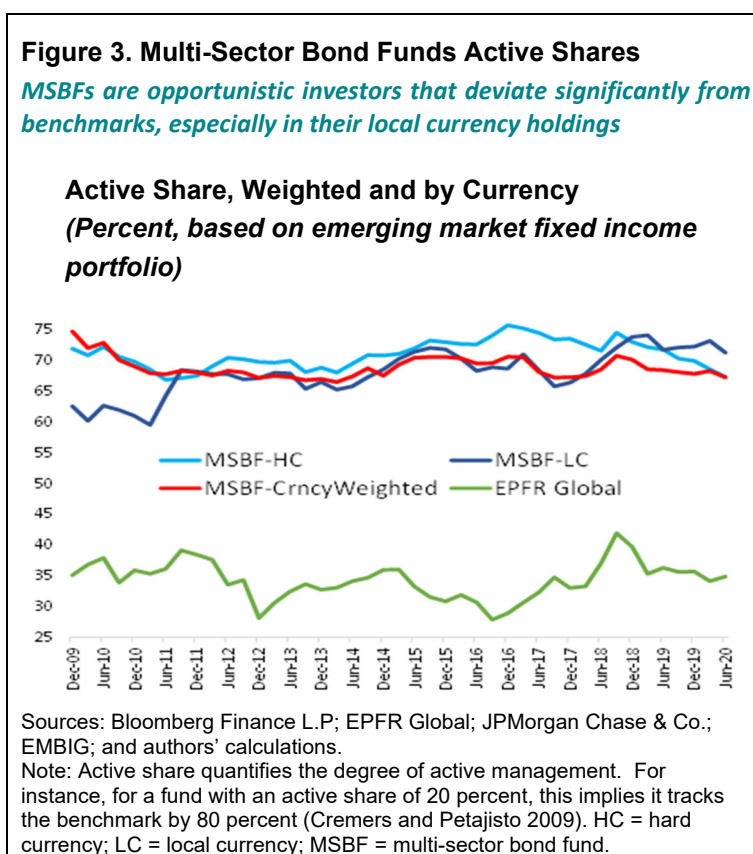
This update extends the sample period from the second quarter of 2018 to the second quarter of 2020, that is, it includes the COVID-19 shock to verify whether MSBFs during tumultuous market times could actually be a potential source of stability. One reason for a stabilizing role is that unlike benchmarked funds, their unconstrained mandate possibly allows a fund manager to hold onto a position in response to a “volatility shock”

³ To quantify the degree of active management (that is, deviation from benchmarks), the note applies a method introduced by Cremers and Petajisto (2009) and used by Miyajima and Shim (2014). This method determines the “active share” of a fund by comparing its holdings to those of its benchmark index, using the J.P. Morgan emerging markets debt indices—hard currency: the Emerging Markets Bond Global Diversified (EMBIG) Index, and local currency: Government Bond Index-Emerging Markets (GBI-EM) Global Diversified Index. The paper then compares the benchmark diversion metrics of MSBFs with EPFR emerging market-dedicated funds and EPFR global bond funds. As expected, MSBFs are found to be very active, on average, and do not adhere to the benchmark index. In contrast, EPFR emerging market-dedicated funds have a low active share, while EPFR global funds have a higher active share, although significantly lower than MSBFs.

in one of the assets, rather than contribute to “fire sales,” thereby mitigating the correlation in emerging market fixed income portfolio flows driven by BDIs. To get a true grasp of the degree of activism, MSBF benchmark diversion is compared to EPFR global bond funds during this period.

Benchmark diversion has fallen during recent market stress, but mostly for hard currency holdings.

Figure 3 shows that, overall, MSBF’s active share (weighted by currency exposure) has fallen since 2018 and this drop has accelerated since the COVID-19 shock. However, the drop in the degree of activism has been significantly larger in hard currency when compared to local currency holdings—in *active share* terms, the hard currency index fell by 3.8 percent versus 1.3 percent for the local currency index in 2020. This differentiation is not without consequences as MSBFs have their largest exposures in local currency (nearly 70 percent of their investment in emerging markets over the past decade). Moreover, during the COVID-19 outbreak MSBFs cut their exposure to emerging markets significantly, especially in local currency bonds. The figure also shows that, on average, MSBFs still have a significantly lower active share than EPFR global funds.



While some portfolio reallocation can be expected, MSBFs do not do this in a proportional manner but focus on the bonds of a few selected emerging market sovereign issuers. Unlike dedicated bond funds, where the decision to invest in emerging markets rests with the end investor, the portfolio managers of MSBFs 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 be highly concentrated. The activism analysis suggests this behavior is particularly strong in local currency bond markets where MSBFs typically have their largest exposures. Local-currency bond markets typically have higher potential returns (currency and local rates exposure), but they can be also riskier.

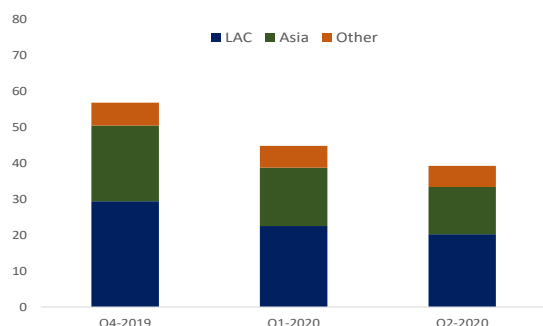
During the COVID-19 outbreak, MSBFs were responsible for an estimated outflow of \$23 billion, almost entirely out of local currency bond exposures. This portfolio reallocation was not done in a proportional

manner, it was concentrated in the local currency bonds of some of the largest and more liquid emerging market sovereign issuers (Brazil and India specially), while MSBFs kept their most illiquid exposures. Figures 4 and 5 show how for the Latin America and Caribbean region, which suffered the largest outflows, the divestments were concentrated in Brazilian local currency bonds while exposures to hard currency bonds remained largely unchanged. In contrast, exposure of MSBFs to less liquid emerging market economies, such as Argentina, remained unchanged, potentially increasing liquidity mismatches in their emerging market portfolios. During the widespread market stress experienced during the COVID-19 shock, MSBF non-benchmarked and concentrated behavior may have contributed to heighten market pressures in the more developed and liquid emerging market bond markets. However, less liquid (and hard currency) markets experienced less MSBF-enhanced volatility *during this period of stress*. A word of caution: this is not to say that *in normal times* their proportionally large positions in these illiquid markets do not call for vigilance, as significant reallocation decisions (in the absence of acute stress or redemptions) can still occur.

Figure 4. MSBFs Portfolio Allocation Change

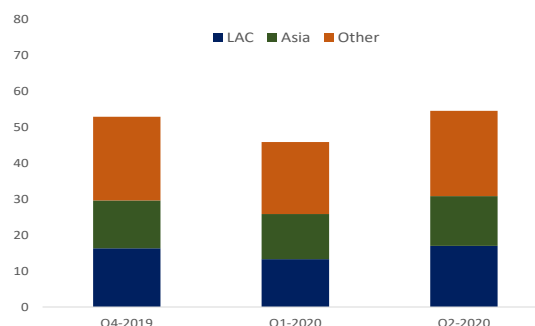
During the COVID-19 outbreak, MSBFs cut most of their emerging market investment in local currency bond markets ... while hard currency holdings also experienced a (small) dip, it was followed by a quick recovery

1. MSBF Local Currency Bonds (Billions of US dollars)



Sources: Bloomberg Finance L.P.; and authors' calculations. Note: MSBF = multi-sector bond fund.

2. MSBF Hard Currency Bonds (Billions of US dollars)

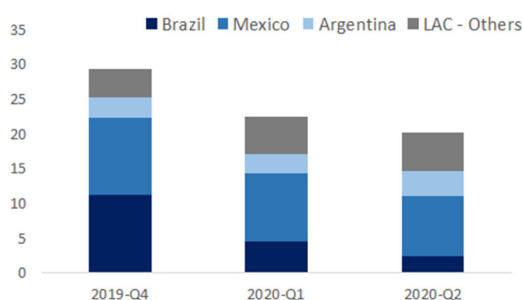


Sources: Bloomberg Finance L.P.; and authors' calculations. Note: MSBF = multi-sector bond fund.

Figure 5. MSBFs Portfolio Allocation Change

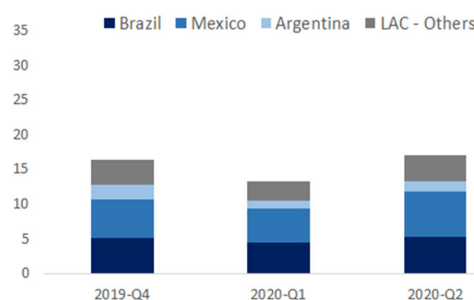
Brazilian local currency bonds bore the brunt of the reduction in Latin America ... while hard currency bond exposures were stable

3. MSBF Latin America Local Currency Bonds (Billions of US dollars)



Sources: Bloomberg Finance L.P.; and authors' calculations. Note: LAC = Latin America and the Caribbean; MSBF = multi-sector bond fund.

4. MSBF Latin America Hard Currency Bonds (Billions of US dollars)

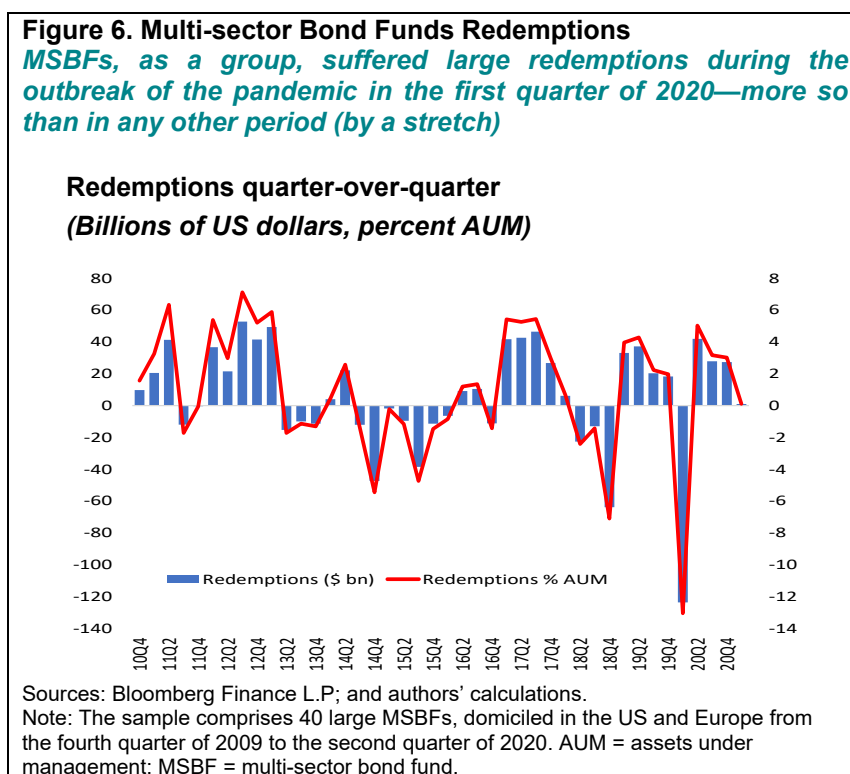


Sources: Bloomberg Finance L.P.; and authors' calculations. Note: LAC = Latin America and the Caribbean; MSBF = multi-sector bond fund.

REDEMPTION ANALYSIS

COVID-19, a shock like no other. While previous episodes of increased risk aversion in the emerging market space provided a glimpse of financial instability risks MSBFs could imply; so far, these shocks did not coincide with wide-spread MSBFs redemptions—isolated redemptions did occur within funds or clustered within fund families (for example, the fourth quarter of 2021, the third quarter of 2015, and the fourth quarter of 2018). By contrast, MSBFs, as a group, reportedly experienced massive outflows when the COVID-19 shock hit, which means portfolio managers were forced to aggressively liquidate positions to raise cash to pay for redemptions. To validate this hypothesis, the authors of this note performed a redemption analysis. Redemptions are defined as returns adjusted for changes in assets under management (AUM).

Figure 6 shows that MSBFs, as a group, suffered large redemptions during the outbreak of the pandemic in the first quarter of 2020—more so than in any other period (by a stretch). It is important to note that the periods of (isolated, clustered, or system-wide) redemptions from MSBFs (with emerging market exposure) coincided with overall risk aversion, suggesting that MSBFs, on balance, do not seem to be a stabilizing force as their forced liquidations, especially in liquid local currency markets (see previous section), tend to exacerbate cross border flows.



REGRESSION ANALYSIS

Large MSBF portfolio reallocations out of emerging markets can be associated with underperformance in the same markets. The observed MSBF reallocation patterns (concentrated and non-benchmarked) and the potentially destabilizing impact implied by the redemption analysis signals the importance of monitoring their footprint and better understanding their asset allocation decisions. To empirically test the implications of their growing role in emerging market fixed income markets, this note builds on the panel regression analysis first presented in Cortes and Sanfilippo (2020) (henceforth, C&S), which suggested that it matters not just that MSBF are investing in emerging markets but also *when* they are (re)allocating. In periods of risk aversion MSBF reallocations could be associated with a significant underperformance of selected emerging markets. Yet, the

analysis in C&S did not account for the recent stress episode, leaving open the question whether during periods of wide-spread financial turmoil MSBFs could be a stabilizing force. The sample, thus, is extended through the second quarter of 2020, to include the COVID-19 shock and the ensuing overall emerging market flows bust and nascent recovery in hard currency.

The impact of MSBFs' reallocations is assessed from the perspective of currency, local currency bond, and hard currency bond markets. The results are summarized in three main regressions, where the dependent variable in each regression is defined as a performance spread over the respective emerging market benchmark—see [Annex 1](#) for further detail on the regression analysis and methodology. For currencies, this translates into the performance spread of the local currency over the J.P. Morgan Emerging Market Currency Index. For local currency bonds, it reflects performance relative to the J.P. Morgan GBI Diversified Index, and for hard currency bonds relative to the J.P. Morgan EMBI-Global Diversified Index. The main explanatory variable is flows of MSBFs holdings. Therefore, the regressor is defined as the first difference log of MSBF emerging market fixed income holdings, adjusted for the changes solely due to the changes of portfolio assets' value. Depending on the dependent variable, the regressor reflects local currency holdings (for currency and local currency bonds) or hard currency holdings (for hard currency bonds). Estimations also include an interaction with a (dummy) variable for risk appetite that takes the value 0 in risk-off periods and 1 in risk-on periods to test the hypothesis that the relationship between changes in MSBF holdings and emerging market currencies/bonds is different in a risk-on environment (overall emerging market inflows) versus a risk-off environment (overall emerging market outflows). These are the key results:

- For the emerging market currency and local currency fixed income regressions, estimation results show the expected signs and are (statistically) significant (*even more so than in C&S*). That is, there is a positive relation between changes in MSBF holdings and (i) currency and (ii) local currency bond performance. Worryingly, this implies that, in a period of overall risk aversion, an increase of MSBF outflows in an emerging country allocation of 1 percent is associated with a deterioration in the performance of the (i) currency and (ii) local currency bonds with underperformance over the emerging market (i) Emerging Markets Currency Index (EMCI), and (ii) GBI benchmark by (i) -1.7 and (ii) -1.9 percent, respectively. In a period of inflows, this impact is moderated to (i) -0.3 and (ii) -0.5 percent.⁴
- For the hard currency fixed income regression, coefficients are significant, yet, at face value, the sign on the MSBFs flows appears counterintuitive. That is, there is a *negative relation* between changes in MSBF holdings and hard currency bond performance. Which suggests that an increase of MSBF outflows in an emerging country allocation of 1 percent is associated with outperformance over the emerging market EMBIG benchmark by $+0.8$ percent. In a period of inflows, this impact is moderated to $+0.1$ percent. Within the context of the negative association, the positive sign on the interaction term makes sense. As before, in periods of overall inflows, the impact of MSBFs (in this case negative) is moderated, as their marginal impact would be smaller with many other investment funds moving into the same space.

To explain the counterintuitive sign, it helps to underscore the comparative resilience of MSBF hard currency holdings observed in section 2 during the COVID-19 episode. More specifically, local currency holdings saw large, disproportionate outflows during this period of risk-aversion and overall outflows. However, MSBFs' hard currency fixed income holdings, although adversely impacted, were more resilient and rapidly recovered even though the overall emerging market fixed income market remained under pressure. Consider, then, the liquidity and size of the overall emerging market hard currency fixed income space, as well as the countries MSBF are positioned in, which complicates parsing out the impact solely due to MSBF flows in the empirical estimation.

⁴ Estimation results for the equivalent regression in C&S were (i) 1.1 and (ii) 1.2 percent. In a period of inflows, this impact was moderated to 0.4 percent in both cases.

ADVANCED ECONOMY VS. EMERGING MARKET FIXED INCOME PORTFOLIO DYNAMICS

The focus so far has been on the emerging market fixed income portfolio, but to fully grasp the disproportionate reallocation patterns (as well as contagion potential) of MSBFs, it serves to compare their behavior in advanced economy markets. As before, the data shows the trends in MSBF holdings adjusted for price effects, where the correction for changes solely due to the changes of portfolio asset values is proxied by the Barclays Global Agg. for advanced economy fixed income, and the JP Morgan EMBG and GBI Diversified for emerging market hard and local currency fixed income, respectively.

While advanced economy exposures are larger overall (see Figure 7), Table 1, which summarizes the quarter-over-quarter percent change, shows that the emerging market portfolio bore the brunt of the pain during stress periods, with significantly larger outflows relative to the advanced economy portfolio in the second half of 2018 and the first quarter of 2020. As discussed in previous sections, this is especially the case for local currency (vs. hard currency). In fact, when the advanced economy market calmed down, MSBFs were still pulling out of emerging market local currency, and already recovered some emerging market hard currency.

In sum, MSBFs can retreat in a disproportionate manner from selected emerging market exposures. As a result, rather than acting as a stabilizing force for emerging markets, their actions achieve the opposite: when facing large redemptions, they pull out the rug underneath their largest emerging market exposures to raise cash. By contrast, they are less prone to raise cash by liquidating their exposures to advanced economy bonds, with their advanced economy portfolio displaying some flight to safety behavior (for example, in the second half of 2018) and rebounding much quicker following drawdowns.

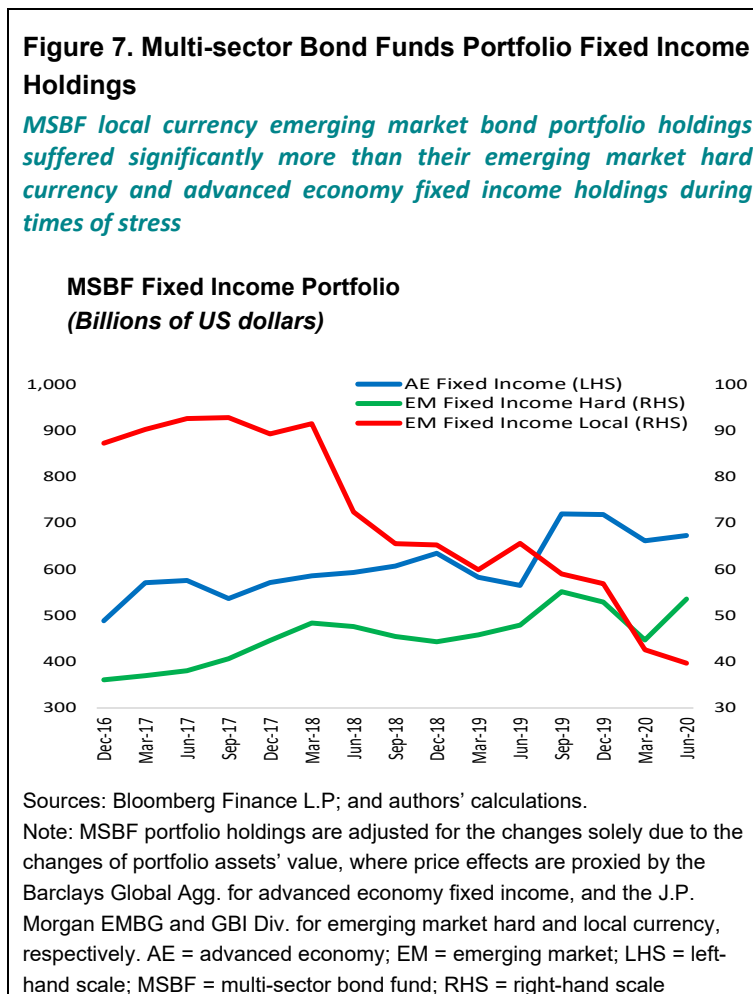


Table 1. MSBF Portfolio (Price-adjusted) Percent Change

	Fixed Income	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2
Advanced Economy	Total	16.8	0.9	-6.8	6.5	2.6	1.2	2.4	4.5	-8.2	-3.0	27.4	-0.2	-7.9	1.8
Emerging Markets	Total	3.1	2.7	2.1	0.3	4.5	-14.2	-7.5	-1.3	-3.6	7.5	0.5	-3.8	-20.5	6.8
	Local	3.4	2.6	0.2	-3.8	2.5	-20.9	-9.5	-0.4	-8.2	9.6	-10.1	-3.6	-25.1	-6.8
	Hard	2.6	2.9	6.8	9.7	8.5	-1.6	-4.5	-2.5	3.3	4.7	15.1	-4.1	-15.5	19.8

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

Note: MSBF Portfolio holdings are adjusted for the changes solely due to the changes in portfolio asset values, where price effects are proxied by the Barclays Global Agg. for advanced economy fixed income and the J.P. Morgan EMBG and GBI Div. for emerging market hard and local currency, respectively. MSBF = multi-sector bond fund.

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Annex 1. Regression Analysis: Methodology

The sample is extended through the second quarter of 2020 to include the COVID-19 shock and the ensuing overall emerging market flows bust and nascent recovery in hard currency.

To discuss the impact of multi-sector bond funds (MSBFs) reallocations on underlying markets—currencies, local currency bonds, and hard currency bonds—this note builds on the panel regression analysis first presented in Cortes and Sanfilippo (2020) (C&S)¹. The sample here is extended through the second quarter of 2020, to include the COVID-19 shock. That said, it estimates the same parsimonious three-dimensional panel regressions with interaction effects. The two cross-section identifiers are (1) the MSBF and (2) the country it is invested in. The third dimension is time. The main regression is specified as follows:

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

where the left-hand scale 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 effects² 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 emerging market currencies/bonds is different in a risk-on environment (overall emerging market inflows) versus a risk-off environment (overall emerging market outflows). The regressions account for cross-sectional dependence and heteroscedasticity.³ The variables included in the estimation are defined as follows:

Dependent variables

Performance Spreads. Performance is determined over the relevant emerging market benchmark and expressed in percent. A positive value indicates outperformance of the domestic asset compared to the benchmark, and vice versa for a negative value.

1. Currency Spread (CmncySP) = (Quarter-over-quarter change in local currency vs. US dollar) – (Quarter-over-quarter change in the J.P. Morgan Emerging Market Currency Index)
2. Local Currency Government Bond Index Spread (GBISP) = (Quarter-over-quarter change in domestic Local Currency Total Return Bond index) – (Quarter-over-quarter change in the total return overall on the J.P. Morgan Government Bond Index-Emerging Markets)
3. Hard Currency Government Bond Index Spread (EMBIGSP) = (Quarter-over-quarter change in domestic Hard Currency Total Return Bond index) – (Quarter-over-quarter change in the total return overall on the J.P. Morgan Emerging Market Bond Index)

Sources: Bloomberg and J.P. Morgan.

¹ Estimations account for cross-sectional dependence and heteroscedasticity.

² An F-test between the pooled ordinary least squares and an (unrestricted) fixed effect model support panel fixed effects. The authors 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 the explanatory variables (results available on demand). At the same time, the time fixed effects (FE) were broadly insignificant. Hence, the authors present the estimation results without it.

³ Standard errors and covariances in the panel regressions are estimated using a (degree-of-freedom corrected) variant of the Panel Corrected Standard Error (PSCE) methodology (Beck and Katz 1995). The PSCE cross-section seemingly unrelated regression (SUR) equations 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.

Explanatory variables

MSBFs Flows. Changes in MSBF emerging market allocations ($\text{dlog}(\text{msbf})$) 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 that the asset returns derived from price changes are approximated by country index returns (GBI for local currency and EMBIG for hard currency).⁴ 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. A positive relationship between changes in (price-adjusted) MSBF holdings and the dependent variable is expected. That is, with larger MSBF purchases (or sales) of assets, the domestic currency or bonds are expected to be associated with outperformance or underperformance versus their emerging market benchmark.

Risk Appetite. We create a dummy variable (DRA) that takes the value 1 in quarters when money is flowing into the emerging market space (risk-on), and 0 in periods of outflows. The values are determined using data on all dedicated emerging market bond funds (local, hard, and blend). In a period of emerging market portfolio inflows, the emerging market asset class as a whole performs well, so a strongly positive relation between the dummy and the dependent variable is expected. The risk appetite dummy is included as an interaction term to test if the impact of a change in MSBF holdings on emerging market 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 emerging market asset class as a whole. Meanwhile in a "risk-off" environment, the effect of changes in MSBF 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 emerging market benchmark is performing badly.

The following key results can be gleaned from the estimations (see table 2):

- For the emerging market currency and local currency fixed income regressions, the results show the expected signs and are (statistically) significant (*even more so than in C&S*). There is a positive relation between changes in MSBF holdings and (i) currency and (ii) local currency bond performance. This implies that, in a period of outflows (DRA=0), an increase of MSBF inflows by 1 percent in an emerging market is associated with an improvement in the performance of the (i) currency and (ii) local currency bonds with an outperformance over the emerging market (i) EMCI, and (ii) GBI benchmark by (i) 1.65 percent (vs. 1.09 percent in C&S) and (ii) 1.87 percent (vs. 1.23 percent in C&S). In a period of inflows (DRA=1), this impact is moderated to (i) 0.30 percent (vs. 0.44 percent in C&S) and (ii) 0.47 percent (vs. 0.41 in C&S).
- For the hard currency fixed income regression, coefficients are significant, but the sign of the MSBF flows shows a *negative relation* between changes in MSBF holdings and hard currency bond performance. This suggests that, in a period of outflows (DRA=0), an increase of MSBF inflows in an emerging country

⁴ The price-adjusted series is determined as follows:

- (1) Determine the quarter-over-quarter growth rate in the market value of the MSBF position: $\Delta MVQ2-1 = ((MVQ2 / MVQ1) - 1)$;
- (2) Subtract the quarter-over-quarter return in the relevant index from the change in MV: $(\Delta MVQ2-1 - RiQ2-1)$;
- (3) Apply the return-adjusted growth rate to the MV in Q1. Such that the price-adjusted MV in Q2 becomes: $MVQ2 = MVQ1 * (1 + (\Delta MVQ2-1 - RiQ2-1))$
- (4) Repeat in every quarter: $MVQ3 = MVQ2 * (1 + (\Delta MVQ3-2 - RiQ3-2))$; and so on.

allocation of 1 percent is associated with underperformance over the emerging market EMBIG benchmark by –0.78 percent (vs. +0.17 percent in C&S). In a period of inflows (DRA=1), this impact is moderated to –0.06 percent (vs. +0.02 percent in C&S).

The opposing developments in local currency versus hard currency flows, and the proposed explanation are in line with the argument in the literature that posits that although borrowing in local currency from foreign lenders mitigates the currency mismatch for the borrower, it transfers the currency mismatch to lender’s balance sheets—a phenomenon dubbed “original sin redux” (Carstens and Shin 2019; BIS 2019). During periods of risk aversion, when local currencies weaken and domestic assets sell off, foreign investors typically reduce their exposure, triggering outflows. Even in the absence of outflows, increased foreign currency hedging could exert substantial pressure on the exchange rate and the cost of funding. Moreover, there is significant pro-cyclicality to flows as emerging market exchange rates play a key amplifying role in the portfolio adjustment of global investors—as local currency spreads and exchange rates move in lockstep, see Carsten and Shin 2019. So, while local currency issuance has its benefits, as it helps sovereigns develop their own local currency denominated rates markets, it has also certain risks, particularly when a large share of the investor base is made of opportunistic and concentrated foreign investors.

Table 2. Estimation Results: Sensitivity of Currency and Bond Indices to Changes in MSBF Holdings

	Panel A.		Panel B.		Panel C.	
	CrncySP		GBISP		EMBIGSP	
dlog(msbf)	1.65	***	1.87	***	-0.78	***
	(0.30)		(0.39)		(0.26)	
DRA	0.06		-0.76		0.14	
	(0.42)		(0.57)		(0.13)	
dlog(msbf) x DRA	-1.35	***	-1.41	**	0.73	**
	(0.44)		(0.55)		(0.30)	
Obs.	4,668		4,339		19,769	
R ²	0.205		0.163		0.049	

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

Note: Panel regressions are estimated using quarterly data from the fourth quarter of 2009 to the second quarter of 2020. Estimations include fund-country fixed effects. Panel A. shows results for the performance spread vis-à-vis the emerging market 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 emerging market 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.