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Drivers of Emerging Market Bond Flows and Prices

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Global Financial Stability Notes **Drivers of Emerging Market Bond Flows and Prices**
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An interesting disconnect has taken shape between local currency- and hard currency-denominated bonds in emerging markets with respect to their portfolio flows and prices since the start of the recovery from the COVID-19 pandemic. Emerging market assets have recovered sharply from the COVID-19 sell-off in 2020, but the post-pandemic recovery in 2021 has been highly uneven. This note seeks to answer why. Yields of local currency-denominated bonds have risen faster and are approaching their pandemic highs, while hard currency bond yields are still near their post-pandemic lows. Portfolio flows to local currency debt have similarly lagged flows to hard currency bonds. This disconnect is closely linked to the external environment and fiscal and inflationary pressures. Its evolution remains a key consideration for policymakers and investors, since local markets are the main source of funding for emerging markets. This note draws from the methodology developed in earlier Global Financial Stability Reports on fundamentals-based asset valuation models for funding costs and forecasting models for capital flows (using the at-risk framework). The results are consistent across models, indicating that local currency assets are significantly more sensitive to domestic fundamentals while hard currency assets are dependent on the external risk sentiment to a greater extent. This suggests that the post-pandemic, stressed domestic fundamentals have weighed on local currency bonds, partially offsetting the boost from supportive global risk sentiment. The analysis also highlights the risks emerging markets face from an asynchronous recovery and weak domestic fundamentals.¹

Emerging markets were affected by the pandemic the most and they continue to be. Excluding China, growth in emerging markets is expected at 6.8 percent in 2021 (as opposed to 7.2 percent in advanced economies), and a two-speed global recovery has taken shape, with emerging markets at a lower gear (October 2021 *World Economic Outlook*). The slower recovery in emerging markets has important implications for capital markets as well, and an interesting disconnect has appeared. This Global Financial Stability Note draws on findings and on several econometric models for the valuation of emerging market bonds and the drivers of portfolio flows derived in

¹ The analysis in this note has also been presented in the Global Financial Stability Report in different forms, prepared under the guidance of Tobias Adrian and Fabio Natalucci. The authors also thank Lucyna Gornicka for valuable guidance and analytical contribution, including in previous versions of the Global Financial Stability Report. The authors thank Patrick Schneider for excellent research assistance and Anna Ilyina, Jeff Williams and Dimitris Drakopoulos for comments.

earlier *Global Financial Stability Reports* (IMF 2018b, 2019b, 2020a) to answer some pertinent questions regarding the drivers of these developments. The policy implications are the same as those expressed in those reports and are not repeated here. Instead, this note aims to collect the findings and methodologies for a more complete discussion.

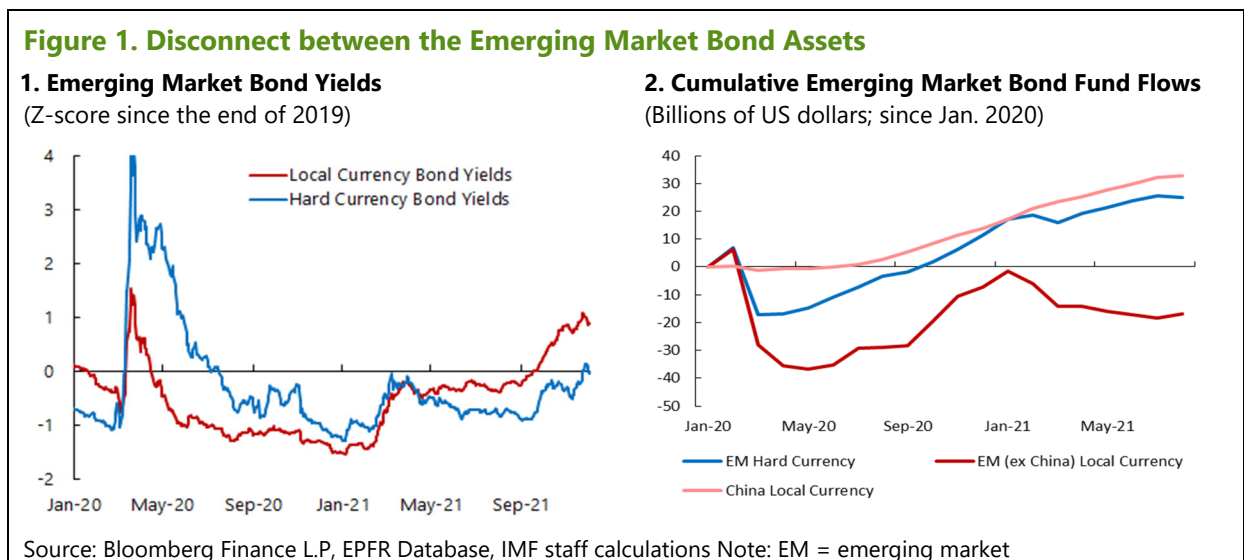
Section 1 of this note discusses the disconnect between hard currency and local currency bonds and portfolio flows and highlights ancillary findings. Section 2 discusses the asset valuation models for local currency and hard currency bond funding costs and Section 3 presents two models for emerging market capital flows: one using the IMF's *at-risk* methodology using a quarter-century of data (IMF 2018a and 2020b), and one that zeroes in the post COVID-19 recovery period, using a simple ordinary least squares (OLS) regression specification.

SECTION 1. DISCONNECT BETWEEN EMERGING MARKET HARD CURRENCY AND LOCAL CURRENCY BONDS

Emerging markets came under unprecedented pressure during the beginning of the COVID-19 pandemic with record high portfolio outflows (IMF 2020), credit rating downgrades (Goel and Papageorgiou 2021) and a sizable sell-off of asset prices. The systemic risk-off episode was countered with unprecedented policy actions by global central banks (IMF 2020), which led to a very sharp revival in the global risk sentiment. Emerging market assets also benefitted from this with a sharp recovery in both funding costs (October 2020 *Global Financial Stability Report*) and portfolio flows (see Goel 2021 for a recent update on emerging market capital flows)

Since then, the recovery has been uneven between local currency and hard currency debt assets. Local currency bond yields have risen rapidly in 2021, despite the decline in US Treasury yields and are now higher than their pre-pandemic level (as of the end of 2019). This contrasts with the significant decline in hard currency bond yields (and spreads) and subsequent stability, especially among higher-rated issuers (Figure 1, panel 1). A similar pattern appears for portfolio flows, where flows to emerging market hard currency bonds strengthened since their bottom in mid-2020, while flows to emerging market local currency bonds have lagged significantly through the pandemic recovery period (Figure 1, panel 2). A key exception is China, where local currency bond flows have remained very strong, driven, in part, by the country's ongoing inclusion in the global benchmark indices (Chen and others 2019; Arsanalp and others 2020).

This sharp disconnect between hard currency and local currency bonds remain an area of key interest for market participants and policymakers. This is especially relevant in the post pandemic era where local currency bond markets remain the major funding source for emerging markets—amidst elevated fiscal deficits (IMF 2021). Weak flows and bond market pressures put the onus on central bank interventions, like asset purchases (Sever and others 2021), to smooth these issues, potentially further exacerbating the financial sovereign nexus issues.



This

paper contributes to the literature by analyzing local and hard currency bonds through similar frameworks for valuations and flows.

1. **Asset Valuation Models:** To assess the drivers of emerging market bond funding costs, a fundamentals-based asset valuation model is constructed based on both domestic fundamentals and external financial conditions. The model is based on a similar structure for both hard currency spreads (based on JP Morgan’s Emerging Market Bond Index Global [EMBIG]), as well as the local currency yields (based on JP Morgan’s Government Bond Index-Emerging Markets [GBI-EM]).
2. **Capital Flow Forecast Models:** To assess the drivers of emerging market bond capital flows, the capital flows at-risk framework is deployed: based on domestic fundamentals and external financial conditions.

In using these models local and hard currency bonds can be compared and their drivers can be examined in a consistent manner. They also serve to: (1) assess the mispricing of emerging market bonds versus the domestic fundamentals (see IMF 2018, 2019); and (2) forecast the portfolio flow outlook based on the current macro-financial environment (see IMF 2020, 2021)

SECTION 2. ASSET VALUATION MODELS FOR HARD CURRENCY VS. LOCAL CURRENCY BONDS

Section 2.1 What Drives Emerging Market Bond Prices?

The pricing of sovereign debt securities for emerging markets is linked to country-specific fundamentals (Edwards 1985) and is influenced by global investors’ risk appetite (Eichengreen and Mody 2000). Strong domestic fundamentals help lower funding costs (Baldacci and Kumar 2010), while tight global financial conditions can widen spreads (Ebner 2009; Peiris 2010). Global risk appetite becomes especially relevant during periods of stress (González-Rozada and Levy-Yeyati 2008) because it can interact with domestic vulnerabilities to amplify the impact on borrowers, especially those with weaker fundamentals (Nickel, Rother, and Rülke 2009). For instance, countries with weaker fundamentals were affected more significantly during the taper-tantrum episode in May 2013. Countries with high external debt were disproportionately affected by a sharp rise in the US dollar and higher US interest rates during April–September 2018 (October 2018 *Global Financial Stability Report*). Credit ratings also

play an important role in determining funding costs (Jaramillo and Tejada 2011; Goel and Ghosh 2011), even after accounting for fundamentals, as they alter investor behavior and eligibility.

Any significant mispricing in the asset markets could pose risks for both investors (valuation losses) and issuers (possible sharp changes in funding conditions). If bond spreads remain compressed relative to fundamentals for a long period, this may lead to an excessive buildup of debt by some borrowers with adverse implications for their future debt sustainability. Overvaluation also increases the risk of an abrupt adjustment in asset prices and, possibly, capital outflows. This could further worsen market access, especially for lower-rated countries, and could make it difficult for countries to raise the funds they need at sustainable terms (Guscina 2017).

While most of the literature has focused on drivers of specific categories of bonds (as discussed above), the lack of a unified framework has made it difficult to compare the drivers between local and hard currency bonds. This is especially relevant now as the median rating between the two types of bonds has narrowed over time (Section 2.2), which implies that the trade-off between issuing hard currency versus local currency bonds is becoming even more pertinent for sovereign bond managers.

Section 2.2 Analytical Framework for the Asset Valuation Models

A fundamentals-based asset valuation model for emerging market hard currency bond spreads and emerging market local currency bond yields is constructed based on both domestic fundamentals and external financial conditions.

Emerging Market Hard Currency Bonds

The model covers 65 emerging and frontier markets, across the five major regions, with quarterly data spanning back almost 25 years to December 1996. However, the time span is uneven, as countries entered the EMBIG Index in different years (IMF 2019 for more details).

The external bond spreads are regressed on domestic fundamental factors and external financial conditions:

$$Spread_{it} = c + \sum_{k=0}^K Fundamental_{kit} * \beta_k + \sum_{j=0}^J GlobalRiskAppetite_t * \alpha_j * Rating_j$$

where

- i (from 1 to 71) is the number of countries in our sample
- k (from 1 to 7) is the number of fundamental factors
- j (from 1 to 8) is the number of ratings (AAA, AA, A, BBB, BB, B, and CCC)

and the fundamental determinants of the sovereign spreads are:

- 1) Domestic Real GDP growth—1 year forward consensus forecasts
- 2) Domestic CPI Inflation—1 year forward consensus forecasts
- 3) Current Account Balance (percent of GDP)
- 4) External Debt (percent of GDP)
- 5) Net Issuance of Foreign Currency Government Debt (percent of GDP)
- 6) Foreign Currency Reserves (percent of GDP)
- 7) External Real GDP growth—1 year forward consensus forecasts

Emerging Market Local Currency Bonds

The model covers 21 emerging and frontier markets, with quarterly data spanning back to December 2001. However, the time span is uneven, as countries entered the GBI-EM Index in different years (IMF 2020 for more details). The local currency bond yields are regressed on domestic fundamental factors and external financial conditions as follows:

$$Yield_{it} = c + \sum_{k=0}^K Fundamental_{kit} * \beta_k + \sum_{j=0}^J GlobalRiskAppetite_t * \alpha_j * Rating_j$$

where

- i (from 1 to 21) is the number of countries in the sample
- k (from 1 to 7) is the number of fundamental factors
- j (from 1 to 2) is the type of rating (Investment grade vs High Yield)

and the fundamental determinants of the sovereign spreads are:

- 1) Domestic Real GDP growth—1 year forward consensus forecasts
- 2) Domestic CPI Inflation—1 year forward consensus forecasts
- 3) Current Account Balance (percent of GDP)
- 4) External Debt (percent of GDP)
- 5) Foreign Currency Reserves (percent of GDP)
- 6) External Real GDP growth—1 year forward consensus forecasts
- 7) US Dollar Index (DXY Index); and
- 8) Foreign investors as a proportion of total ownership.

In both the models, the global risk appetite factor is proxied by the US BBB-rated corporate spread. It is also worth noting that “Rating” is a dummy variable corresponding to whether it is an IG-rated country or a HY-rated country. It is not an interaction term. Given data limitations, it is difficult to build reliable country-specific models, especially for countries with short data. Since many of emerging and frontier markets behave similarly under stress, the analysis focuses on panel estimation. An OLS model is estimated using an unbalanced panel.

Section 2.3 Results for the asset valuation models

Emerging Market Hard Currency Bonds: The final model has an adjusted R² of almost 50 percent, with most variables both economically and statistically significantly. The domestic fundamentals are important in explaining hard currency spreads. The analysis indicates that higher real GDP growth and lower inflation reduce spreads. Similarly, higher reserves and lower external debt compress spreads. Figure 2, chart 1 plots the standard errors (+/- 2 standard deviations) of the coefficients and all of them are statistically significant. The analysis also establishes the impact of risk aversion on spreads by credit rating. It finds that lower-rated issuers are more sensitive to changes in global risk appetite as compared to higher-rated issuers (Figure 2, chart 2). A 100-basis points increase in US BBB corporate bond spreads could widen spreads of B-rated emerging market bonds by more than 200 basis points, compared to only 50 basis points for A-rated emerging market issuers. It has two major implications:

- A global stress episode could result in a sudden repricing of risk and lead to a swift exodus of such investors, which could cut off market access for lower-rated borrowers.

- The COVID-19 sell-off has led to a significant pickup in the ratings downgrade (see Goel and Papageorgiou 2021 for an update of emerging market rating changes). This implies that on average, the emerging market universe might become a lot more sensitive to external shocks.

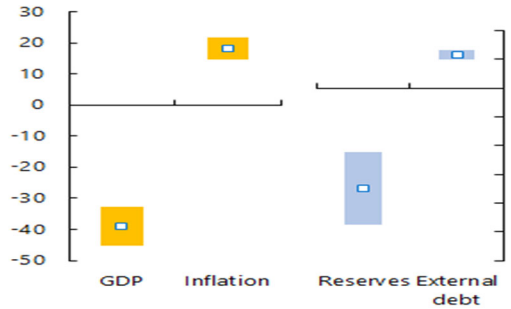
Rolling regressions also show that the sensitivity of emerging market spreads to external conditions has risen significantly in recent years. The sensitivity factor for a B-rated issuer was about 1.5x in 2015, which has risen by almost 40 percent to 2x now. The changing investor base may have played a role, given that the exposure of Emerging markets to potentially “flighty” investors has been growing. Another explanation can be through the exposure to benchmark-driven investors (Arsnalp and others 2020), which are found to be more sensitive to external shocks than other investors with this sensitivity on the rise.

Emerging Market Local Currency Bonds: The final model has an adjusted R^2 of almost 70 percent, with most variables both economically and statistically significant. The analysis shows that strong fundamentals tend to reduce funding costs, while elevated vulnerabilities and lower buffers tend to have the opposite effect. High inflation increases local currency bond yields, while better growth prospects contribute to lower yields. (Figure 2, chart 3; See Baldacci and Kumar 2010; Jaramillo and Weber 2013; Piljak 2013). Elevated vulnerabilities and lower buffers tend to increase the cost of funding: higher levels of external debt and lower levels of foreign exchange reserves are associated with higher local currency yields. IMF staff analysis suggests that the sensitivity of local currency bond yields to the level of foreign exchange reserves has increased in recent years, while sensitivity to external debt appears to have declined somewhat as the search for yield has intensified (Figure 2, chart 4). Lower-rated bond issuers are found to be more vulnerable to swings in global investor risk sentiment than higher-rated issuers, as suggested by analysis of yield sensitivity to global risk-aversion shocks. Greater foreign participation also helps reduce local currency yields (as in Ebeke and Lu 2015), which reflects the investor confidence channel as well as the role of foreign investors in the development of local bond markets (Peiris 2010).

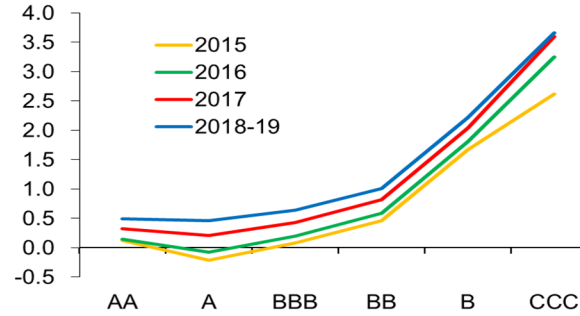
Figure 2. Drivers of Emerging Market Hard Currency and Local Currency Funding Costs

1. Emerging Market Hard Currency Spreads: Coefficients of Select Fundamental Variables

(Spread per percentage point; shaded areas are the standard errors)

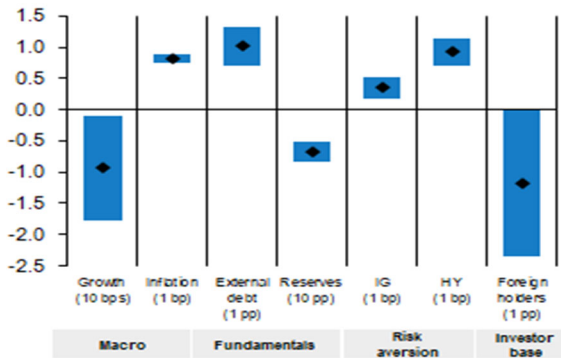


2. Emerging Market Hard Currency Spreads: Coefficients of the Global Risk-Aversion Variable Per Different Rating Buckets, Over Time



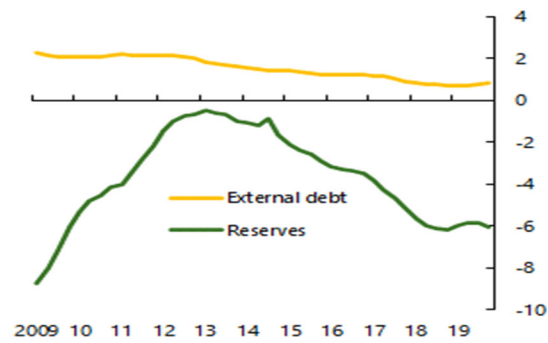
3. Emerging Market Local Currency Yields: Sensitivity to Global and Domestic Factors

(Scaled coefficients in black; blue bars are 2 standard deviation errors)



4. Emerging Market Local Currency Yields: Sensitivity to Reserves/GDP and External Debt/Exports

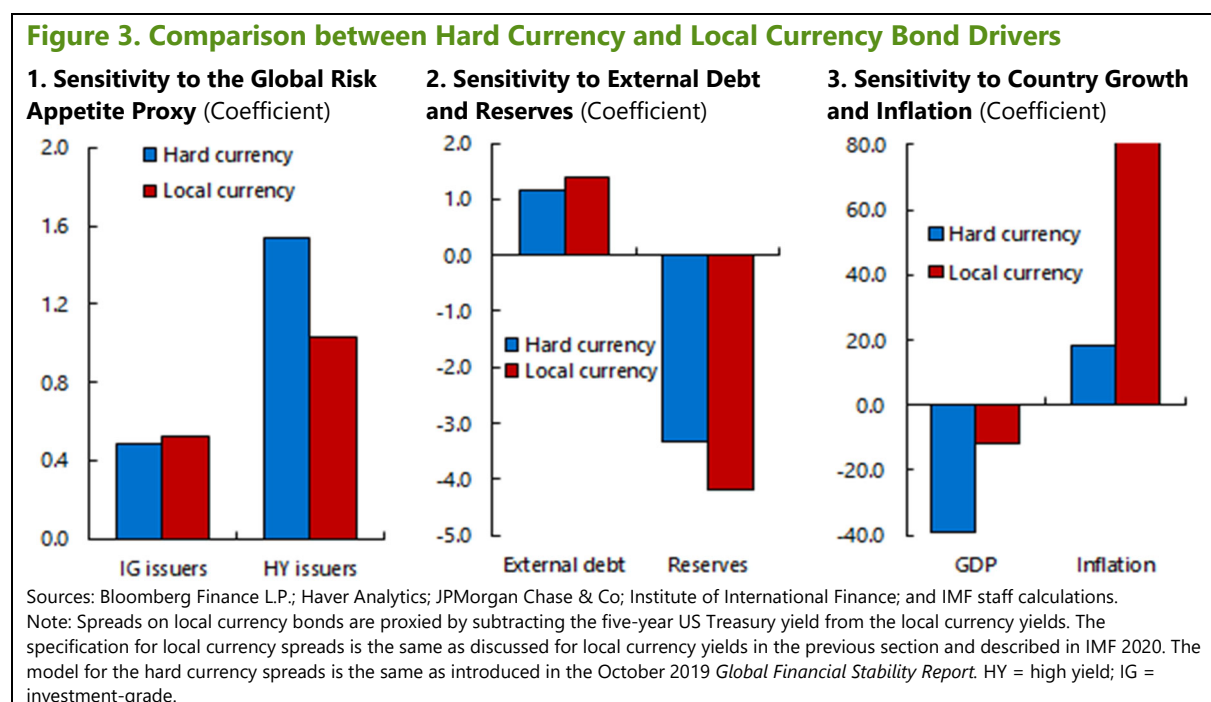
(Coefficient, rolling 24-quarter regression)



Sources: Bloomberg Finance L.P.; Haver Analytics; JPMorgan Chase & Co; Institute of International Finance; and IMF staff calculations
 Note: In panel 3, variable coefficients are scaled by a given metric; for example, for every 10 basis points increase in growth, yields change by -0.9 basis point per the panel. For every 1 percentage point increase in external debt (to exports), yields change by 1 percentage point. HY = high yield; IG = investment-grade.

Comparing the drivers between hard currency and local currency bonds

There are also notable differences between hard and local currency debt in terms of drivers of their valuations. Hard currency bond spreads, especially for high-yield issuers, are affected about 60 percent more by global risk aversion shocks (Figure 3, panel 1). Local currency spreads are more sensitive to domestic vulnerabilities, including external debt and reserve adequacy (Figure 3, panel 2). Du and Schreger (2013) also find that local currency bond spreads are less sensitive to global factors than hard currency bond spreads. Economic fundamentals have a mixed effect, with domestic inflation disproportionately increasing local currency spreads (Figure 3, panel 3). Every percentage point rise in inflation increases local currency bond spreads by more than 70 basis points, but by only 20 basis points for hard currency bond spreads. GDP growth has a greater impact on hard currency bond spreads. This is especially relevant now as inflation in emerging markets is rising sharply, leading to investor concerns about monetary policy trends (Goel and others 2021).



SECTION 3. DRIVERS OF HARD CURRENCY AND LOCAL CURRENCY CAPITAL FLOWS

The literature finds that the drivers and volatility of capital flows vary significantly across the different types of flows (see Koepke 2019 for a survey of capital flow drivers). Debt flows are typically considered the riskiest (meaning the most volatile or reversible), while foreign direct investment is deemed the safest (IMF 2018; Korinek 2018; and Ghosh and others 2017). Within debt flows, the drivers vary significantly between local currency and hard currency debt flows (IMF 2019; IMF 2020).

The difference between the two asset classes were analyzed in two ways:

1. Longer time period: Capital flows at-risk analysis, using a quantile regression
2. Zeroing in the post-COVID-19 recovery, using a simple OLS regression

The results are corroborated using both analysis methods.

Section 3.1 Analytical Framework for the Capital Flows At-Risk Model

Methodology: Quantile regressions are used to project the entire distribution of capital flows over the next four quarters (in line with the methodology adopted in IMF 2018; Gelos and others 2019; and Goel and Miyajima 2021). Such projections are made based on global and domestic factors in the current period. The advantage of this approach is that it helps to differentiate between drivers of flows during typical flows, as well as during more extreme flow periods (like surges or reversals). All regressions also include dummies for the pre-global financial crisis, global financial crisis, and post-global financial crisis periods and country fixed effects

Global “push” factors are proxied using the global financial conditions (sourced from IMF 2018), while country-specific factors correspond to the “pull” drivers in the literature. All domestic variables are lagged to limit potential for reverse causality.

- 1) a ratio of short-term external debt to foreign exchange reserves, as a proxy for external balance sheet vulnerabilities
- 2) year-over-year real GDP growth rate
- 3) financial market depth index, proxying the level of development of the domestic financial markets
- 4) capital account openness, measuring the severity of restrictions on cross-border capital transactions
- 5) GDP growth per capita, a measure of economic development and domestic wealth.¹

Data: The analysis is based on a sample of 15 large economies for which sufficiently long data on local currency debt flows are available: Brazil, China, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Poland, Russia, South Africa, Turkey, and Ukraine. Hard currency debt flows are calculated as the residual from the overall portfolio debt flows. The data is based on quarterly flows from the first quarter of 2000 to the first quarter of 2019 (an unbalanced sample).

Output Summary: To summarize the information from individual quantile regressions, the analysis distinguishes between the lower tail of the predicted distribution, median predicted flows, and the upper tail of the distribution:² the average of coefficients from regressions for the 5th to 30th percentiles reflects the impact of a variable on the lower tail of the conditional predicted distribution of future flows, the average of coefficients from regressions for the 40th to 60th percentiles—on median flows—and the average of coefficients from the regression for the 70th to 95th percentiles—on upper tail of the distribution.

¹ In principle, a lower GDP per capita should be associated with higher average flows (since capital should be expected to flow to capital-scarce countries) but other effects are conceivable—for example, differences in GDP per capita are also correlated with differences in financial and institutional development.

² The overall results hold true even when only the coefficients of the extreme quantiles are considered but averaging across quantiles gets an approximation of the shape of the distribution.

Section 3.2 Results for the Capital Flows At-Risk Model

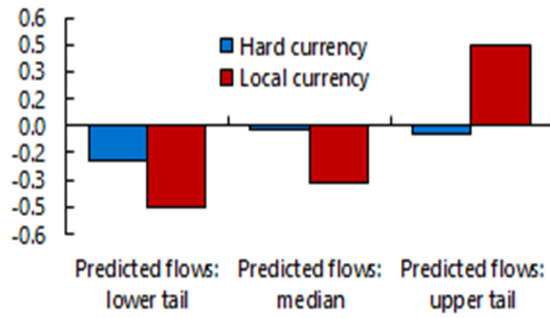
The analysis of capital flows corroborates the findings from the drivers of the funding cost analysis. The analysis shows that better domestic fundamentals and economic prospects improve the outlook capital flows (across both types of flows), while vulnerabilities weigh on the capital flow outlook. The analysis also shows that the sensitivity of capital flows varies significantly across the capital flow regimes (typical flows versus extreme flows)—in line with the analysis in literature (Gelos 2019; Goel and Miyajima 2021). The drivers are also found to differ across the local currency and hard currency debt flows.

- Local currency debt flows appear to be more sensitive to domestic vulnerabilities than hard currency debt flows. A higher level of short-term debt and weaker reserve adequacy significantly increase the likelihood of negative or weak inflows, especially for local currency flows (Figure 4, chart 1). An exception is local currency flows during surges, which reflects investor confidence in successful refinancing.
- Local currency debt flows are more sensitive to domestic growth prospects than hard currency debt flows, especially the likelihood of extreme flows. Higher growth boosts expected flows but affects the tails of the portfolio flow distribution twice as much (Figure 4, chart 2). This also means that better growth prospects limit the likelihood of weak or negative inflows but also amplify the likelihood of very large inflows. The outlook for local currency flows is almost three times more sensitive to domestic growth than the outlook for hard currency flows. Greater sensitivity of local currency bonds to domestic factors provides diversification for global investors (Miyajima, Mohanty, and Chan 2012).
- Deeper domestic financial markets improve the outlook for both hard currency and local currency flows (Figure 4, chart 3) and significantly limit the likelihood of negative or weak flows. Local currency flows are more sensitive to this variable as well.
- Tighter global financial conditions decrease expected portfolio flows and have a disproportionately larger impact on the likelihood of extreme flows. Nier, Sedik, and Mondino (2014) also finds that risk appetite becomes the dominant driver of flows during crises. Moreover, hard currency flows are almost twice as sensitive as local currency flows to global financial conditions (Figure 4, chart 4). This may reflect differences in the investor base—hard currency bonds are typically held by global investors— whereas the local currency bond markets are typically dominated by domestic investors. For example, benchmark-driven investors have a larger presence in hard currency than in local currency sovereign debt markets (April 2019 *Global Financial Stability Report*).

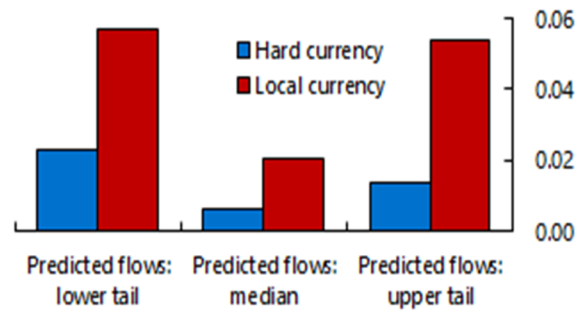
The analysis implies that a much weaker growth outlook for emerging markets due to the COVID-19 pandemic will significantly worsen the outlook for local currency flows, while the outlook for hard currency flows will be relatively more affected by the sharp tightening in global financial conditions. This is exactly in line with the trends in the global financial markets since the COVID -19 sell-off (Section 1).

Figure 4. Drivers of Emerging Market Hard Currency and Local Currency Capital Flows

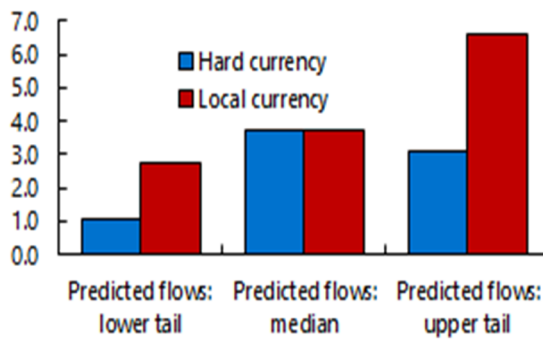
1. Coefficient of Short-Term Debt/Reserves for Hard Currency and Local Currency Flows



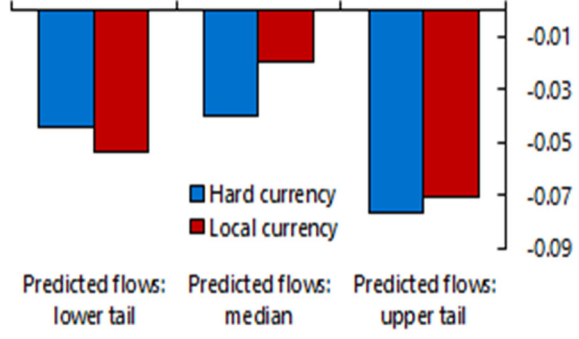
2. Coefficient of Domestic Growth for Hard Currency and Local Currency Flows



3. Coefficient of Market Depth for Hard Currency and Local currency Flows



4. Coefficient of Global Financial Conditions for Hard Currency and Local currency Flows



Sources: Bloomberg Finance L.P.; Haver Analytics; JPMorgan Chase & Co; IIF; and IMF staff calculations IMF 2020 plots the detailed coefficients along with the standard errors, and the results are consistent with this analysis.

Section 3.3 Capital Flow Drivers during the Post-COVID-19 Sell-Off Recovery

As discussed in Section 1, the trends in the portfolio flows after the COVID-19 sell-off have been a story of two dimensions. The data using the fund flows corroborates the trends from the balance-of-payment equivalent flows. Hard currency bond fund flows have recovered sharply since the pandemic sell-off in March 2020. In contrast, local currency bond fund flows remained weak throughout 2020 (despite the improvement in the global risk sentiment) and improved only toward the latter part of the year (Figure 5, chart 1).

The drivers of different types of fund flows were analyzed through a simple OLS regression (between external risk sentiment and a proxy of domestic growth optimism)

Specification

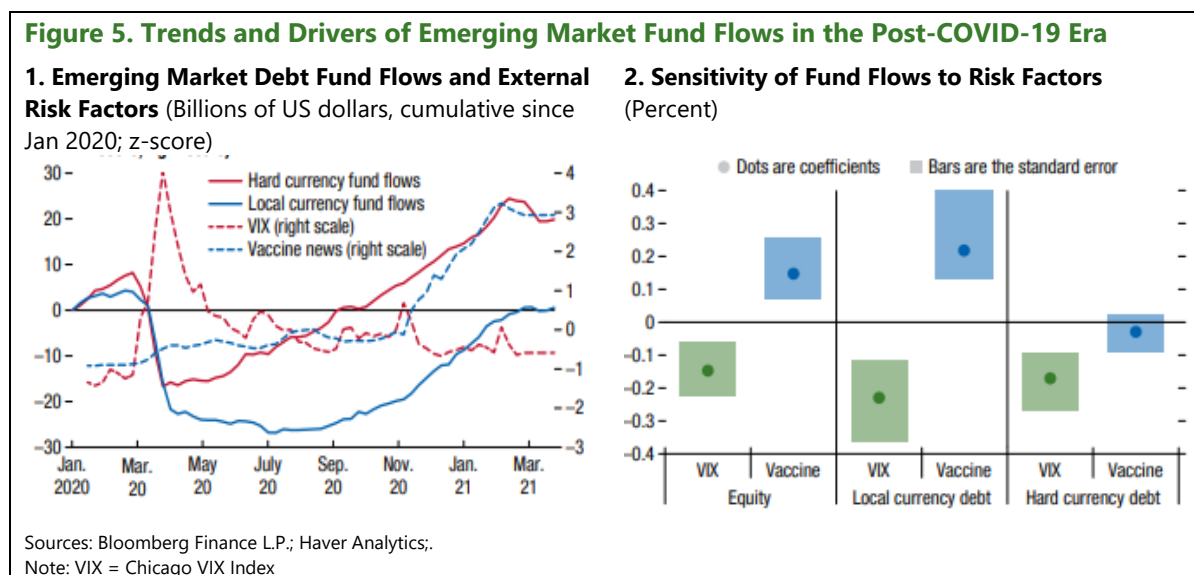
$$Flows_t = c + GlobalRiskAppetite_t + VaccineOptimism_t$$

Where,

1. **Flows** are alternated between local currency bond fund flows, hard currency bond fund flows, and equity fund flows. Data is sourced from EPFR at a weekly frequency
2. **Global Risk Appetite** is proxied using the implied US equity volatility
3. **Vaccine Optimism** is proxied using the data from Google search trends. This index proxies the growth optimism that had started getting priced into the global markets after the vaccine approvals in the fourth quarter of 2020.

Results

Analysis shows that the global risk sentiment had a statistically significant impact on all types of portfolio flows (Figure 5, chart 2, green bars). In contrast, the growth optimism (proxied by the vaccine index) had a statistically significant impact on just equity and local currency bond flows (Figure 5, chart 2, blue bars). Hard currency flows were impacted just by the global risk sentiment and not the growth optimism. These results corroborate the capital flows at-risk analysis, showing that local currency bond flows are highly sensitive to domestic fundamentals, while hard currency bond flows have a particularly notable sensitivity to the external risk sentiment.



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