INTERNATIONAL MONETARY FUND

Monetary and Capital Markets Department

# Investment Funds and Financial Stability

## Policy Considerations

*Prepared by an IMF staff team led by Antonio Garcia Pascual, Ranjit Singh, and Jay Surti*

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# Executive Summary

The marked growth of investment funds—particularly of money-market and open-end funds over the last two decades and especially after the global financial crisis (GFC)—has been a significant driver of the rising prominence of nonbank financial intermediation. These funds are critical to intermediation in core financial markets such as the United States Treasuries and corporate bonds and are a crucial driver of global capital flows to emerging market and developing economies.

A key feature of most investment funds' business models is to offer daily liquidity to investors, similar to that offered by banks on their demand deposits.[1] As these funds have ventured beyond large-cap equity and advanced economy sovereign bonds into corporate debt (including speculative-grade), real estate, and emerging market securities, their ability to make good on their promise of daily liquidity has come under increasing scrutiny and has repeatedly been under pressure in the face of occasional exogenous shocks. Unlike banks, investment funds generally do not benefit from public backstops in the form of discount window access or deposit insurance and an extensive literature has documented that they can be subject to fire sale externalities, illiquidity spirals, and, occasionally, even run risk.

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[1]There are some exceptions, such as certain mutual funds that offer monthly or quarterly liquidity. However, such funds represent a small fraction of total assets under management. We are generally excluding private funds including private equity, hedge funds, and family offices from this paper, which tend to feature lock ups.

These adverse feedback loops became evident during the turmoil triggered by the onset of the global COVID-19 pandemic that started in January 2020 and accelerated markedly in March 2020. As risk asset prices dropped rapidly in response to the pandemic shock, investors' risk assessment grew sharply and triggered portfolio reallocation in favor of relatively safe assets, leading to a dramatic sell-off of risky assets. As emphasized in the April 2020 and October 2020 Global Financial Stability Reports (GFSR) and our previous analyses, the selloff amplified the initial shock as the rise of risk aversion, market illiquidity, and adverse feedback loops amplified the initial fall of asset prices. Under such stressful conditions, the liquidity mismatch between these funds' assets and liabilities contributed to shock amplification, with investor outflows and the associated asset fire-sales by fund managers combining to eventually threaten broader financial stability. This motivated central banks to step in aggressively via repurchase agreements and outright asset purchases that were large, quickly scaled up, and broadly spread across asset classes. Arguably, these adverse feedback loops in the investment funds sector complemented selling pressures from other banks and nonbank financial institutions.

Policy makers were alarmed by the speed and magnitude of the amplification of asset price declines across markets and by the sudden illiquidity, including in the most liquid asset market of all—the US Treasury market. Selling pressures were amplified across a diverse set of institutions, including investment funds. While longer-term yields fell sharply throughout February and early March, in mid-March longer duration Treasuries sold off aggressively, leading to a sudden rise in yields, indicating that longer-term Treasury securities were no longer traded as a hedge asset.

All of these developments raised questions about the effectiveness of post-GFC financial sector reforms, and specifically, whether the reforms went far enough, to enhance financial market resilience to shocks. Concerning investment funds reforms, the focus has been on the adequacy of existing risk management and supervisory tools.

In this context, we identify four key policy objectives. First, we propose to address incentives of investors to front run others when adverse shocks occur. Second, we analyze the inherent tension between daily liquidity and exposure to illiquid assets. Third, we argue that frictions in some important asset markets need to be addressed. Fourth, we advocate for mitigating cross-border spillovers to emerging market and developing economies.

The paper identifies specific tools targeted to address these objectives. Investors' early exit incentives can be best addressed by increasing the value of waiting to sell fund shares. And the risks inherent to the sector's liquidity and maturity transformation can be reduced through a combination of liquid-

ity management tools of increasing intensity to be deployed sequentially. In terms of liquidity backstops, market-based solutions, such as dealer pre-commitments or more robust trading arrangements, should be the first line of defense, buttressed in the event of tail episodes, by central bank emergency liquidity support. When combined with appropriate domestic macroeconomic and macroprudential policies, these measures can also lessen cross-border contagion, a risk increasingly material to financial stability in emerging markets and developing economies. The overall benefits of our policy recommendations, especially the reduced risk of market turmoil and financial instability, would carry significant welfare gains for issuers and investors that would more than offset any adjustment costs borne by them.

The paper's analysis underscores the importance of the ongoing Financial Stability Board-led process of identifying policy options, involving national authorities and the International Organization of Securities Commissions and other standard setters. In this context, the global nature of the investment fund business and fungibility of financial flows makes it vital to ensure consistency of global policy choices that can secure financial stability by precluding regulatory arbitrage.

CHAPTER

# 1 Introduction

Spectacular growth in market-based finance[1] during the last two decades is reflected in the evolution of investment funds into significant players in the global economy and financial system. During this period, the share of global financial assets held by nonbank financial institutions (NBFIs) grew to 50 percent, with over a third of these assets accounted for by investment funds. This trend growth in financial service provision by investment funds[2] accelerated after the global financial crisis (GFC) owing to a combination of factors, including a pullback of banks due to crisis-related losses, tighter risk management and enhanced regulation; technological changes that changed market structures; and the long period of low interest rates and asset returns that gave impetus to search-for-yield by investors. By exploiting opportunities provided by this confluence of drivers, money market (MMF) and open-end (OEF) investment funds have become critical to supporting economic activity, including through their intermediation of a significant share of global, cross-border capital flows to emerging market and developing economies (EMDEs).[3]

Last year's pandemic-triggered financial market turmoil was centered around the business activity of these funds.[4] Dollar-denominated nongovernment

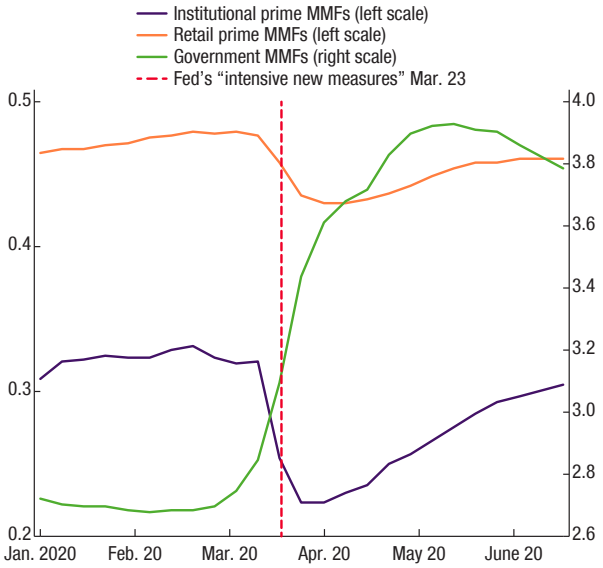
[1]Market-based finance can be understood as liquidity, maturity and credit transformation services provided by non-bank financial intermediaries to institutional and retail investors. Relative to banks' provision of these services, market-based financial intermediaries do not necessarily support their business with large balance-sheets and equity; hence, they can pass on a significantly larger (range of) financial risks to end-investors.

[2]For the purpose of this paper, when we refer to investment funds, we include money market funds, open ended funds such as mutual funds, closed end funds, and exchange traded funds. We exclude hedge funds, private equity funds, family offices, pension funds, and insurance funds.

[3]Financial Stability Board (2020b).

[4]IMF (2020b) and Hespeler and Suntheim (2020). This paper does not assess the implications for other parts of the NBFI universe implicated by the March 2020 market turmoil and other recent events in advanced economies and EMDEs, including elevated interconnectedness of NBFIs and banks and data gaps related

**Figure 1. Investor Flows to MMFs (January–June 2020)**
*(Total net assets, trillions of US dollars)*




Sources: Bloomberg Finance L.P.; and Investment Company Institute.
Note: MMFs = money market funds.

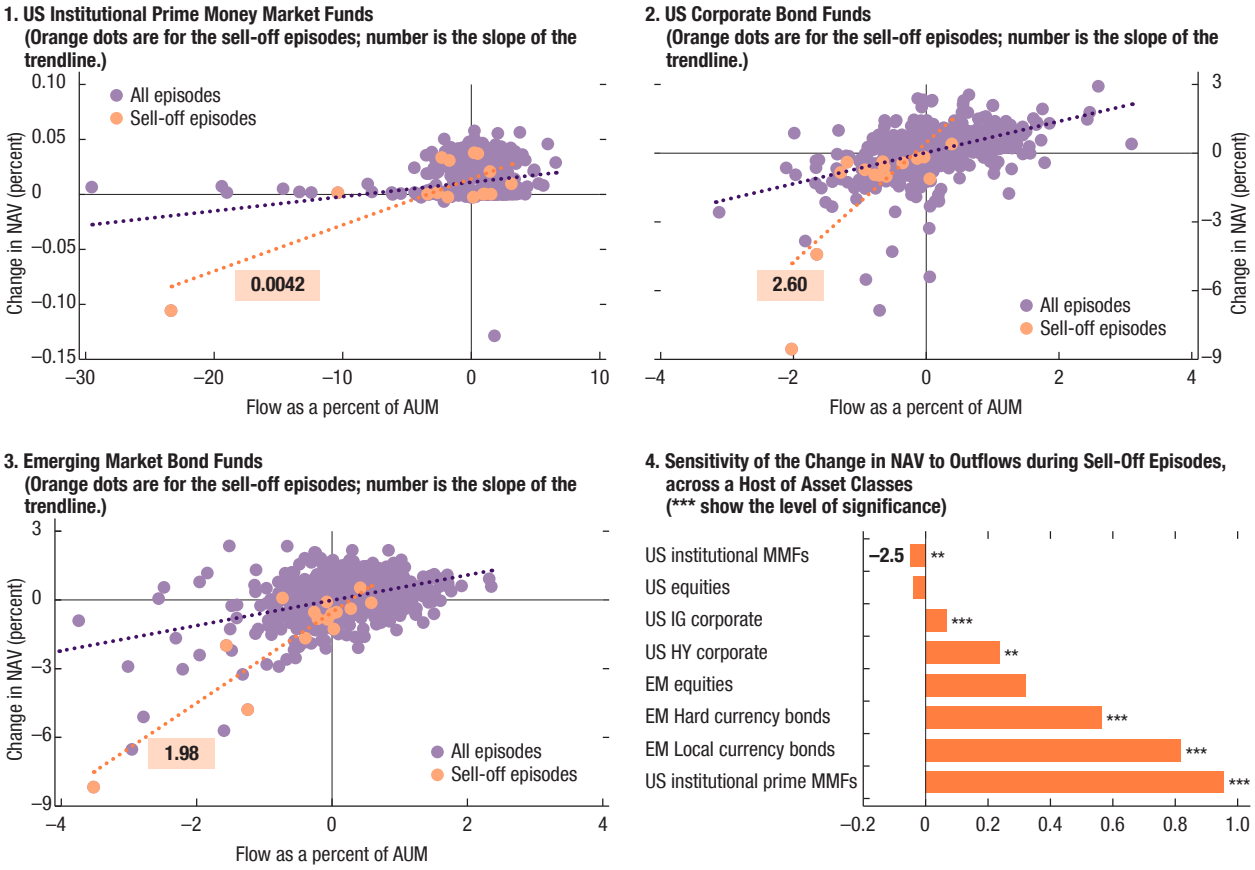
MMFs both in and outside the United States experienced historically significant redemptions during this period (Figure 1). These market pressures abated only after the Federal Reserve announced a number of important liquidity backstops, as well as outright purchases of US Treasury securities, corporate bonds, and certain money market instruments via special lending facilities.[5] As with MMFs, OEFs invested in asset classes such as high-yield corporate bonds and real estate experienced significant redemption pressures. This *dash-for-cash* had a cross-border dimension with international asset managers pulling out of EMDEs, triggering a widening in sovereign risk premia and leaving many of these countries with financing gaps and much tighter financial conditions (IMF 2020b, FSB 2020a, 2020b). The increase in co-movement between outflows from OEFs invested in corporate bonds and EMDE securities or from institutional MMFs invested in non-government assets and the decrease in market value of these assets points to the potential importance of the shock amplification channel in driving market turmoil (Figure 2).

Both the growth and financial stability challenges posed by these funds is being driven by an increase in their role in liquidity, maturity, and credit transformation. As with bank demand deposits, fund investors enjoy access to daily liquidity but also the promise of higher returns. However, unlike banks, investment funds do not have access to government backstops in the form of central bank discount windows and deposit insurance. Hence, daily liquidity can be fragile. Such fragility is contained when funds invest primarily in very liquid assets such as large cap equities and sovereign bonds of advanced economies (AEs). However, after the GFC, OEFs have begun to increasingly offer investors exposure to less liquid assets (for example, corporate bonds, real estate and EMDE securities). The ability of fund managers to deliver on the promise of daily liquidity, especially after large adverse shocks, relies on running down liquidity buffers (paying out cash and selling Treasury securities)

to the same; procyclicality of CCP margins; and the impact of rising life expectancy and persistently low interest rates for pension funds and life insurers.

[5]Annex 1 provides details regarding select central bank facilities to support funding markets.

**Figure 2. MMFs and OEFs—Amplification during Sell-Off Episodes**




Sources: EPFR; Haver Analytics; Morningstar; and IMF staff calculations.
Note: All panels are calculated on the basis of weekly changes in net asset value (NAV) and flows from September 2012 to now. The sell-off episodes correspond to those weeks during which VIX is above the 2 standard deviation value on a historical basis. Analysis in panel 4 is adjusted for the historical difference in the volatility of the respective asset classes. Statistical significance in panel 4: * = 10 percent; ** = 5 percent; *** = 1 percent. AUM = assets under management; MMFs = money market funds; and OEF = open-end funds.

and, thereafter, on sales of underlying assets. As those assets become illiquid when adverse shocks are severe, fire sale externalities can amplify downward moves in asset prices, liquidity can dry up, and risk aversion can increase. In this context, the March 2020 events underscore two things. First, the significance of amplification potential in markets for assets offered by MMFs and OEFs. Second, the significant potential for contagion of shock amplification to deeper and more liquid markets, including US Treasuries.

This has raised concerns about whether risk management tools and post-GFC reforms adequately address the evolution in risk transformation services offered by funds to investors. Sustained investor sell-off from these funds occurred in spite of post-GFC reform applied to them and it was ultimately

central bank action that precluded a broader financial stability fall-out.[6] Therefore, the March 2020 events have triggered a comprehensive reexamination of the need for further and definitive policy action.[7] In this regard, it will be important to identify the key policy targets and the risk management and supervisory tools best suited to address them. Given the global nature of the business, it is also imperative that policy reform be achieved on an internationally coordinated basis through the FSB-led process and participation of IOSCO and other standard setters to ensure consistency and preclude regulatory arbitrage.

This paper clarifies that three objectives are paramount. First, *policy needs to contain the likelihood and magnitude of adverse feedback loops*, triggered by investors' reaction to negative shocks, which can lead to suboptimal outcomes from a policy perspective. Given the huge magnitude of the COVID-19 shock, investors had strong incentives to reallocate their portfolios. However, such valid concerns can amplify the adverse impact on asset valuations and market liquidity. For example, a mass sell-off can be generated by investors' fear that other investors are going to sell out in a context where market liquidity has been dented by the shock. This can lead to excessive downward pressures on asset prices and the funds are left with illiquid assets. Second, *liquidity risk management needs to be strengthened to deal with adverse feedback loops and large adverse shocks*. MMFs and OEFs offer investors daily liquidity like banks do on their demand deposits, but they do not benefit from the extensive government backstops that banks have (discount window and deposit insurance). Yet, many of these funds invest in securities that can become illiquid. Even if policy contains risk of adverse feedback loops, given coordination failures and higher risk aversion, some increase in investor outflows from risky assets is clearly inevitable after negative shocks or sharp increases in economic uncertainty. Policy should aim to limit the excessive amplification of such sell offs. Third, *policy needs to explore scope for more robust market backstops and trading arrangements* to enhance liquidity of the funds' assets.

Effective policies to reduce the incidence of adverse feedback loops reduce investors' (perceived) gains from early redemption. Last year's events underscore that such shock amplifying sell-offs are especially important for non-government MMFs offered to institutional investors, and were triggered by

[6]Post-GFC reform applicable to investment funds differed across countries. For example, while the United States removed stable net-asset-valuation (CNAV) practice for non-government MMFs offered to institutional investors outright by 2016, corresponding reform in the European Union was not based on an equally stark boundary depending on investors and assets.

[7]In the aftermath of the March 2020 events, the FSB is looking at the issues around NBFI, as part of its holistic review program of the March 2020 events (FSB 2020a) and has set up a Steering Committee on NBFIs.

investors' fear that redemptions would be prohibited if their funds' liquidity, which they could all observe in real-time, dropped below a pre-announced threshold. Consequently, the closer such a fund was to this hard threshold, the greater the fear of liquidity being gated and the higher the incentive to run. A powerful remedy to this first-exit motive would be to decouple MMFs' decisions to gate redemptions from hard, observable liquidity triggers that could inadvertently become bad coordination devices for investors. OEF investors seem to fear that a redemption spike would result in a sharp fall in what they can recover if they delay their own exit. Since exiting investors impose a negative externality on markets by inducing a fire-sale of assets, the appropriate policy solution could be a tax, called *swing pricing* which reduces the sales price for investors who exit early but promise a greater value to those who wait through a *tax transfer*. Additional measures include minimum balance-at-risk and anti-dilution measures.

In this paper, it is argued that a *waterfall* of liquidity management tools (LMTs) is needed for investment funds to reduce risks inherent in liquidity transformation. The waterfall approach consists of progressively more aggressive measures, implemented by different types of tools, that seek to ensure the functioning of funds under increasing pressure, either from exogenous adverse shocks or adverse feedback loops generated by investor behavior. Two ideas permeate the tools populating the waterfalls, that is, to increase liquidity buffers and to increase their usability—the *waterfall* approach seeks to conserve liquidity and prevent a value-eroding fire sale of assets. For MMFs, increasing liquid asset requirements and making them countercyclical would be a first line of defense; for larger shocks and more uncertain environments, these would be followed sequentially by implementation of arrangements to lock-in a proportion of investors' shares for a minimum amount of time; offering to redeem withdrawals by institutional investors in-kind instead of in cash; and finally, temporary gating of outflows as a macroprudential intervention if the earlier measures fail to stem them and threaten the funds' viability. For OEFs, the policy design idea is similar: to move away from unqualified daily dealing by increasing the quantum and usability of liquidity buffers, with the waterfall tools being of the same kind, that is, redemption deferrals; followed by redemption-in-kind for certain investors; and market-wide fees or gates. Moreover, since OEFs engage in significantly greater maturity transformation than MMFs, a broader balance-sheet matching option available to policy makers and fund managers is to offer only daily redemptions to investors in sufficiently liquid assets with capped maturity. This would leave OEFs investing in liquid assets actively traded in secondary markets, such as certain large-cap equity and sovereign bonds largely unaffected, albeit, policy makers would need to remain vigilant to the possibility of the liquidity characteristics of these assets changing over time.

This *waterfall* approach has the advantage of reducing and more evenly distributing the adjustment costs imposed by reform on investors and markets. This reflects three factors. First, in tandem with policies that attenuate first-exit incentives, they reduce the likelihood of adverse feedback loops and associated losses, thereby increasing investor returns in bad states of the world. Second, since feedback loops are less likely, liquidity management tools that are costlier to investors and markets within the waterfall, such as deferred and in-kind redemptions and gates are unlikely to be deployed. Third, the waterfall distributes costs more evenly across different investor types. For example, in the case of MMFs, increasing buffers and making them more usable is beneficial to investors prioritizing liquidity but potentially costly to those looking for more return. On the other hand, such tools provide fund managers more headroom against fire-sales of less liquid assets which benefits all investors and debt issuers.

In addition to these measures that would materially raise the resilience of funds and markets, viable liquidity backstops should be explored, starting with market-based solutions. The waterfall approach does not directly address the dearth of liquidity in key asset markets such as corporate bonds and commercial paper. Complementary market-based solutions to improve liquidity of such assets would increase the beneficial impact of investment fund reform and decrease reliance on central bank support by relegating it into the tail of shocks.

Financial stability considerations would argue for central banks stepping in to provide liquidity to financial markets during extraordinary tail events. Effectiveness of such emergency support is underscored by the positive impact of the Federal Reserve's MMF liquidity facility and outright purchases or the European Central Bank's additional quantitative easing, which quickly reversed redemption runs last year. The relationship of central banks with investments funds differs markedly from their relationship with commercial banks. Central banks were created as backstops to ensure the stability of banking systems, and were eventually complemented by deposit insurance, which allowed commercial banks to offer daily liquidity on demand deposits and engage in leverage, maturity and liquidity transformation without suffering frequent runs as in the past. While the market liquidity of investment funds' assets in normal times allows them to offer daily liquidity even in the absence of discount window access and central bank liquidity assurance to investors, the possibility of feedback loops after severely adverse shocks represents a significant macro-critical risk. In such circumstances, central banks can provide backstop liquidity via asset purchases and special lending facilities. Yet such intervention should be contained to extreme events, and our proposed reforms aim at making the investment funds sector more stable and central bank intervention less likely, thus containing any moral hazard. In

contrast, in banking systems, moral hazard is contained via extensive prudential supervision and regulations.[8]

EMDEs have benefited from the rapid growth of capital flows intermediated by investment funds, but potential investment flow reversals also bring new financial-stability risks for EMDEs. Reallocations from risky to safe assets by global asset managers (following shocks) has an international dimension in the form of cross-border spillovers of market volatility that EMDEs need to manage appropriately when taking advantage of investment fund opportunities. Evidence suggests that international asset managers are sensitive to global risk factors in addition to purely domestic EMDE characteristics. Importantly, this sensitivity to global risk factors has been rising over time as international capital markets have become more integrated and efficient. Concentration risk is also a concern for some recipient countries: what may seem a small share in the portfolio of a large asset manager, can be a disproportionately large inflow for a small emerging market. In addition, there are risks of contagion through concentration risks, which can lead to de-stabilizing sudden stops and relatively large capital flow reversals, potentially exacerbating pre-existing vulnerabilities in EMDEs.

Better regulation of global asset managers, when combined with appropriate domestic policies in EMDEs, can go a long way in addressing cross-border spillovers. Appropriate responses require a combination of both recipient and source country policies. Policy levers available to recipient countries include the recently developed Integrated Policy Framework (IMF 2020d, 2020e) which gives guidance to recipient countries on the mix of tools to cope with destabilizing capital inflows, including intervention in the currency market, macroprudential and capital flow management. Over the medium term, recipient countries should also foster domestic markets development and the appropriate use of debt management tools. Source countries also have an important role through the policies outlined above to strengthen OEFs' liquidity risk management (LRM) and reduce risk of bad coordination, therefore reducing amplification potential at the source.

Several additional policy options are desirable to secure the gains to financial stability from this core set of reforms. First, policy makers need to obtain comprehensive and regular information on fund risk taking on a comparable basis across jurisdictions and markets which may call for them to prescribe a

[8]The trade-off between protecting the financial system against collapse by providing official backstops in emergency situations and engendering moral hazard reflected in an increase in risk appetite of the private sector in normal times is fundamental. The logic of the waterfall of policy interventions with central bank emergency liquidity assistance placed at the end is to attenuate this trade-off in two ways. First, policy tools placed higher in the waterfall serve to tighten prudential rules governing the operation of investment funds. Second, placing central bank backstop at the bottom of the waterfall reserves its use for situations where its option value is highest, namely, in the tail of the shock distribution.

uniform measurement methodology to the industry. Second, reporting and disclosure practices in relation to OEFs' liquidity should be enhanced. This ensures continuous visibility of the liquidity risk management frameworks, practices, and challenges to relevant stakeholders. Third, greater room could be given to using discretionary judgment to align the liquidity of a fund's liabilities with its assets from the outset, including a determination of whether it is desirable to recommend against the use of open-end structures for funds intermediating into very illiquid assets. Fourth, strengthening regulation and increasing supervisory attention, to make them commensurate with the risks that the sector poses to financial stability is paramount.

This rest of the paper is organized as follows. Chapter 2 provides a review of the regulatory approach of the investment funds sector and highlights a growing divergence between the current approach and evolution of investment funds' business models. Chapter 3 analyses the key concerns in the MMF sector. Chapter 4 discusses issues within the OEF sector and Chapter 5 assesses issues arising in the context of cross border funding into EMDEs. A final Chapter offers some conclusions.

CHAPTER

# 2 Portfolio Allocation, Systemic Risk, and Approach to Regulation

*Adverse shocks can generate incentives for investors to front-run others in selling off their fund shares. If a sufficient number of investors act on such incentives, this may force fund managers to fire-sell assets. If this decreases asset prices, this will strengthen investor incentives to sell-off, thereby amplifying the impact of the initial shock. The sector's growing macro-critical and potentially systemic importance in financial markets and increased intermediation of less liquid assets on the back of on-demand liabilities implies that its shock amplification potential has become much stronger. Corresponding enhancements to liquidity risk management tools and prudential regulations governing their use and calibration are necessary to safeguard financial stability.*

## Rising Exposure to Liquidity and Credit Risk—Supply and Demand Factors

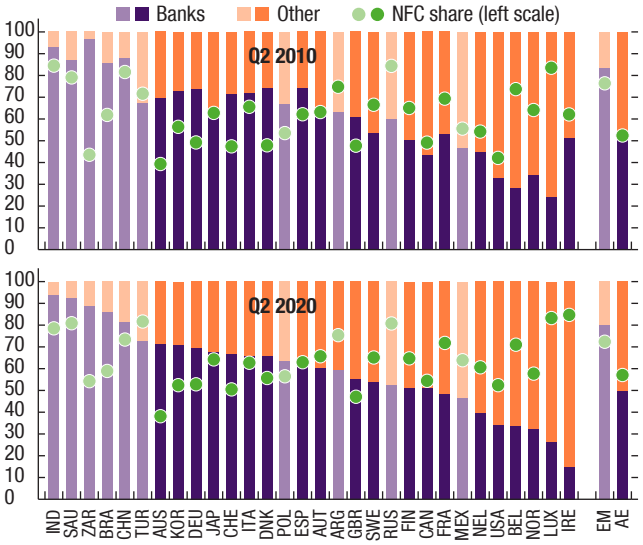
Investment funds have expanded credit risk offered to investors significantly since 2010. Investors' credit exposure is primarily to nonfinancial firms (NFCs) who tend to be riskier than households, especially in recent years when their elevated debt burdens have risen further (Figure 3, panel 2). At a system wide level, investment funds have increased their share in credit provision to residents (United States and euro area) and non-residents (euro area) primarily through purchases of debt securities (Figure 3, panels 3 and 4).

The rising share of investment funds in credit intermediation reflects both cost efficiencies in their business model and comparative advantages relative to the heavily backstopped and regulated banking system post-GFC. Banks benefit from extensive government backstops, but in turn pay a price in terms of heavy supervision and regulation, including macroprudential and microprudential supervision and regulation and stress testing. As investments

## Figure 3. Rising Relevance of Investment Funds in Credit Provisioning

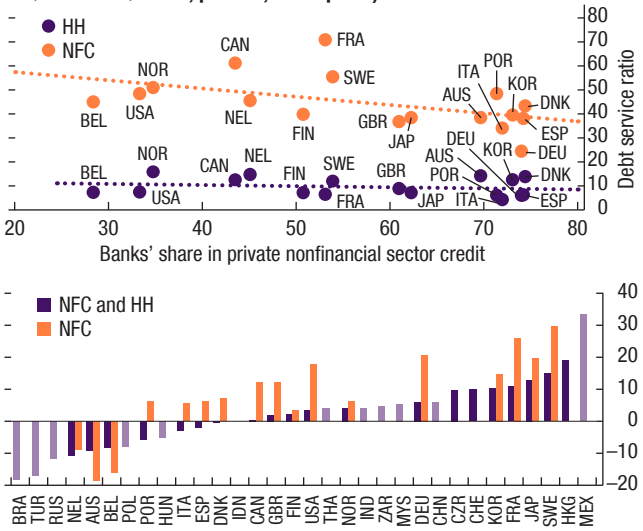
*NBFIs, and external lenders, increased their credit provisioning to the private non-financial sector with nonfinancial companies taking up most of this credit supply.*

**1. Sources of Credit to Private Nonfinancial Sector and Share Taken up by Nonfinancial Firms**
**(Percent, Q2:2020, left scale)**



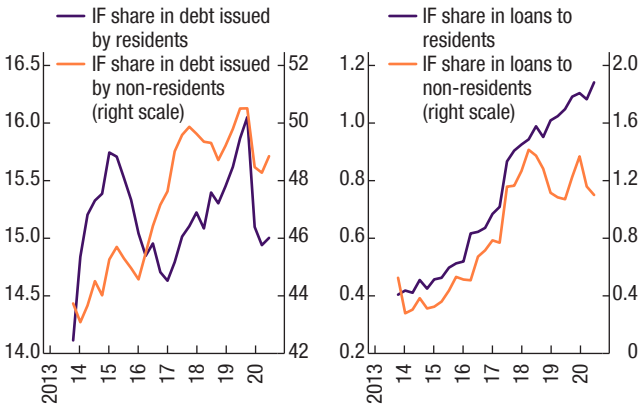

*Since the debt service ratios of NFCs exceed those of HHs, NBFIs tend to be exposed to the riskier borrower type for which credit risks grew over the last three years also faster than for HHs.*

**2. Debt-Service Ratios and Banks' Shares in Private Nonfinancial Sector Credit**
**(Percent, Q2:2020, upper panel; growth in debt-service ratios over Q2:2017 to Q2:2020, percent, lower panel)**



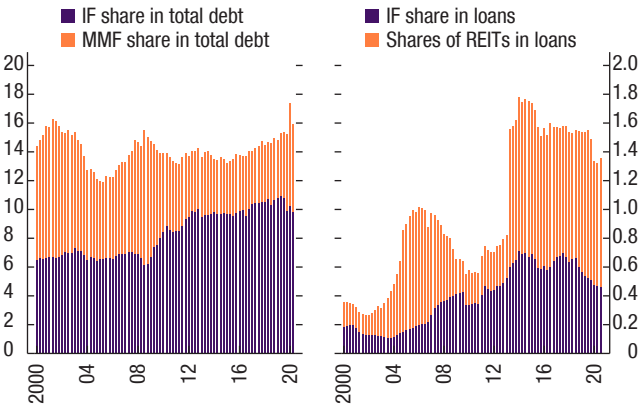

*Investments funds increased their footprint in EU debt and loan ...*

**3. Share of Investment Funds in Credit Extension to EU Residents and Nonresidents**
**(Percent)**




*... as well as in US debt and, together with REITs, in US loan markets.*

**4. Share of Selected Fund Types in Credit Extension to US Residents**
**(Percent)**




Sources: Bank for International Settlements; Bloomberg Finance, L.P.; and Haver Analytics.
Note: In panel 1, regions include additional countries not displayed. Lighter hues in panels 1 and 2 denote EMs. National authorities pointed to limitations in the underlying data reported by the Bank of International Settlements, such as potential inclusion of intercompany lending, the use of estimates for sectors' share in the provision of various credit items, and not necessarily complete coverage in the data on the maturity of debt items. HHs = households; NBFIs = nonbank financial institutions; NFCs = nonfinancial firms; and REITs = real estate investment trusts.

funds do not benefit from explicit, regular backstops, they are more lightly regulated and can thus offer very efficient cost structures for credit intermediation. Their governance structures are also simpler, more transparent, and easier to manage. Intra-firm incentive problems are much less severe compared to banks. However, the role of investment funds in the sell-off of March 2020 suggests that the regulatory approach should be revisited. Offering daily liquidity to investors even in the absence of discount window access and deposit insurance needs to contain liquidity, maturity, and credit transformation appropriately to calibrate any tail event central bank intervention to an appropriate frequency.

It is also important to point out that institutional investor demand for risky assets reflects search for yields in an environment of ever declining real rates. Fixed income funds allow investors to gain exposure to corporate debt, including longer-maturity and lower-rated securities (IMF 2019). For example, their EMDE debt exposure surpasses the corresponding allocation in the debt universe (Figure 4, panel 1), and bond fund allocations have outpaced equity fund allocations since 2008 (Figure 4, panel 2). Growth in leveraged exchange traded funds (ETFs) since 2013 points to search-for-yield in passive funds (Figure 4, panels 3 and 4). These additions to investor opportunity sets were made possible by faster growth in institutional flows that were attracted to risky assets due to their greater sensitivity to the low interest rate environment (IMF 2015).[1]

## Systemic Risk Implications of Changes in Investor Risk Appetite and Funds' Portfolio Allocation

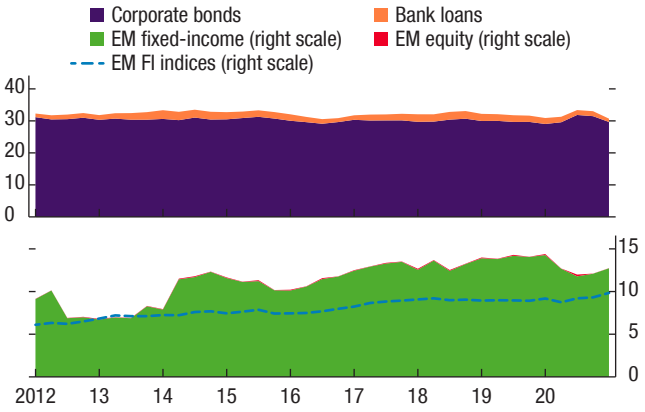
Investor herding into these asset classes may have contributed to increased potential for feed-back effects in asset valuation. Rising return correlations across fixed income funds reflects growth in common risk exposures and greater conformity in decisions to retrench back to home markets or to reduce liquidity buffers (IMF 2019). Corporate bond funds, especially when invested in less liquid bonds, appear inclined to herd in sales of underperforming bonds (Cai and others 2016), which likely reflects the shift in the investor base towards institutional investors since they tend to sell underperforming and buy overperforming funds with higher intensity than retail investors (Miguel and Su 2019). The greater inclination to herd of institu-

[1]It is important to note that market-based financial intermediation, particularly debt markets, provide an important countercyclical buffer against shocks by providing firms and financial institutions with a spare tire to secure the (re)financing necessary to maintain operations. Evidence from the United States demonstrates that issuance in primary debt markets can partially fill funding gaps opened by crisis-induced declines in the supply of bank loans, in particular for bigger, higher rated and less leveraged issuers and/or those which have more tangible assets and broader opportunities for additional investments (Adrian, Colla and Shin 2012).

**Figure 4. Search for Yield Tendencies**

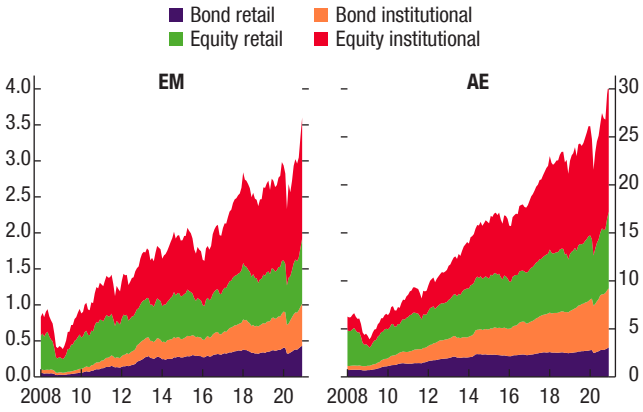
*Fixed-income fund increased their exposure to EM debt ...*

**1. Asset Class Portfolio Shares of Fixed-Income Funds and Selected Indices (Percent)**



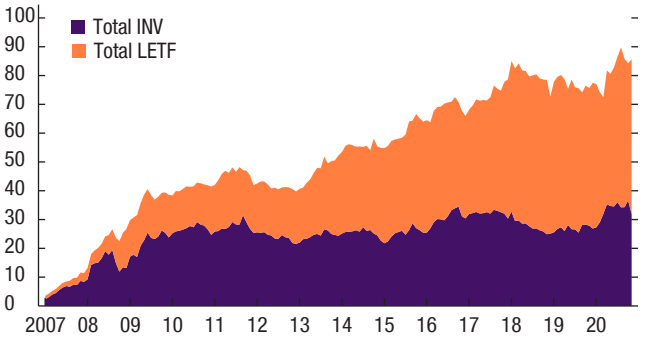

*... with bond funds growing faster than equity funds.*

**2. Capital Allocated to Funds (Trillions of US dollars, monthly)**



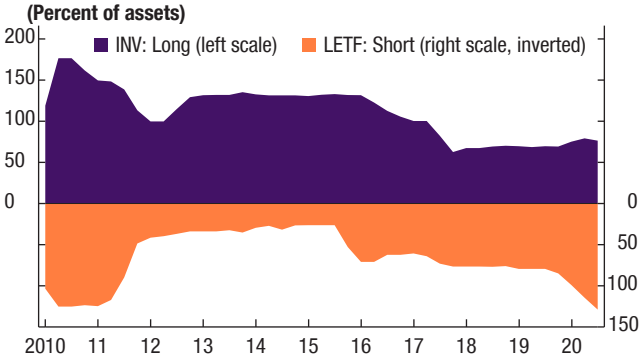

*The leveraged ETF industry revived after 2014 again ...*

**3. Asset of Leveraged and Inverse ETFs (Billions of US dollars)**




*... as funds also started to increase positions in derivatives.*

**4. Offset Cash Positions for Derivative Exposures of Leveraged and Inverse ETFs (Percent of assets)**




Sources: Haver Analytics; and Morningstar.
Note: Panels 1 and 2 depict data for funds with assets of more than $1.25 billion. ETFs = exchange-traded funds.

tional investors may also spread to the retail side in markets where there is significant disparity in investor information and sophistication.

While providing benefits to investors and financial stability, the growing share of passively managed funds may also have intensified commonalities in asset valuation and exposure to common shocks. The share of assets managed by passive OEFs and ETFs in the global funds industry almost tripled to 29 percent over the last decade, presumably also driven by the cost advantages that passive funds offer through lower fees that translate into stronger performance compared to their active peers (ESMA 2020). Passive investment vehicles tend to provide stable funding, for example to emerg-

ing market economies, as run risks appear less pronounced than for their active peers (Anadu and others 2018). Respective exposures, however, also relate increasingly to shared global risk factors (see Chapter 5). Additional financial stability concerns exist around the rebalancing of short positions by leveraged/inverse ETFs in case of adverse price movements, adding to the potential feed-back loops in prices. Concentration tendencies found in the passive fund sector imply some potential for the pooling of risks in individual entities. Index inclusion effects may add to price commonalities, in particular concerning a rapidly growing passive fund industry and in some cases may augment credit risks emanating from leverage constituents.

These factors increase amplification risk externalities to asset markets that are inherent to investment funds' business model. First, funds offering stable or low volatility net asset value (NAV) to investors are susceptible to run risk generated by an early-exit premium incentive similar to fractional reserve banking. Funds offering pass-through-risk products like US institutional prime MMFs and OEFs are susceptible to run risk because (near)-same-day redemption generates strategic complementarities of exit via a first-mover advantage in stressed markets (IMF 2015, 2019). Second, when investment funds intermediate flows into less liquid assets and rely on leverage, this early-exit premium can increase significantly (Choi and Kronlund 2018). In stressed markets, fund NAV falls between the date an investor redeems and the date by which an equivalent market value of underlying assets is liquidated with this being paid by investors choosing to hold onto their fund shares. The less liquid the asset, the longer the time differential between redemption and liquidation and the greater the negative externality on investors delaying exit. Such investors may be hit much harder in leveraged funds if the market value of the funds' derivatives positions move unfavorably under such conditions. Third, the growing use of passive-index and benchmark-driven investment funds increase exposure to common shocks which can, in turn, increase adverse feedback loops if exposures to assets with lower and more procyclical liquidity are increasingly simultaneously. Fourth, greater costs of maintaining liquidity buffers in a low yield environment means pressure on liquidity cushions even outside the universe of passive funds.

Other changes to the cost and supply of market liquidity provision serve to sharpen systemic implications of growing amplification risk from the investment funds business model. The net supply of liquidity from bank broker-dealers has fallen in steady-state terms after the GFC, reflecting several factors, including enhanced internal risk management and prudential oversight (Adrian and others 2017). This has added to *wrong-way risk* wherein during periods of stress, collateral haircuts and repo funding rates increase

and the supply of liquidity from broker-dealers falls at a time when it is needed the most.

## Implications for Approach to Regulatory Oversight

Investor protection and market conduct have been the traditional cornerstones of the regulatory framework for the securities sector. It was the relationship between securities firms and their clients, rather than potential interactions between securities markets and the broader financial system, that was central to the development of prudential rules and their compliance oversight and enforcement. Investment funds were viewed as "pass-through" vehicles whose clients bore the financial risks with full awareness of potential for capital loss and where the level of risk assumed was determined by investor risk appetite. Regulations sought to ensure that investors were provided with adequate information to make informed decisions and securities firms obliged to put clients' interests ahead of their own.

This traditional approach has evolved in response to the growing systemic importance of the asset management industry. IOSCO's Objectives and Principles of Securities Regulation now include a specific principle[2] on the importance of systemic risk in regulators' mandates and standards related to Collective Investment Schemes, focusing more attention on financial stability issues (valuation, liquidity and leverage). NBFIs, particularly MMFs and OEFs, have become prominent in the FSB's work program. The IMF's Financial Sector Assessment Program (FSAP) has emphasized incorporating financial stability into securities regulators' mandates and has focused its policy analysis on prudential issues relevant to financial stability.[3] National authorities have been gradually targeting early vulnerability detection in the asset management sector and expanding the set of policy options to act on emerging system-wide issues. This includes more granular data collection, incorporating stress testing by investment funds into the regular monitoring framework and enhancing the regulatory toolkit.

Nonetheless, challenges to implementation remain and recent FSAPs have found that continuous growth in the sector's complexity and macro-financial importance present new policy challenges (Box 1). The growing size of the already significant sector and the recent incorporation of the upgrades noted above can put a strain on supervisory resources and many jurisdictions are

[2]Principle 6 (*The Regulator should have or contribute to a process to identify, monitor, mitigate and manage systemic risk, appropriate to its mandate*) was added in the 2010 update of IOSCO Objectives and Principles.

[3]Examples include recommendations of the US FSAP 2015 for the entire securities sector and the Technical Notes on securities regulatory and supervisory issues in recent FSAPs, including Ireland 2016, U.K. 2016, Germany 2016, Luxembourg 2017, The Netherlands 2017, New Zealand 2017, Sweden 2017, Brazil 2018, and the US 2020.

still unable to deliver adequate onsite inspections as part of their supervisory cycles or lack the necessary resources to fully exploit for supervisory purposes, the granular data which is now being collected. The growth in scale and complexity has led policymakers to recognize the importance of LRM in the investment fund sector. However, not all countries have expanded LRM tools to the same extent or significantly beyond full redemption suspensions, in some cases, due to limits on regulators' legal powers. Even where these tools have been introduced, in the absence of mandatory obligation for fund managers to apply them, the industry has not moved to a market equilibrium entailing their active use. Looking ahead, widening the tool-kit available to fund managers and giving consideration to a more prescriptive approach to their adoption appears warranted.

### Box 1. Asset Management: Overview of FSAP Findings

*In the last five years, FSAPs have examined the risks and adequacy of regulation in asset management in some of the largest global markets. The summary here is drawn from systemic risk assessments in three countries and regulatory assessments in 11 others in FSAPs between 2015 and now across advanced and emerging economies.*

Systemic risk assessments found asset managers and funds to be highly interconnected with the financial system. This is the result of funds investing in other funds and in bank issued securities and the credit lines banks extend to them. Analysis therefore focused on shock amplification vulnerability, adequacy of risk management frameworks and tools and policy options to buttress these and market backstops.

Data and analytical limitations suggest that the impact and transmission mechanisms are incompletely understood. Besides data gaps at the national level, obtaining and reconciling data on cross-border flows remains a challenge.

The ability of bond funds active in HY and EME markets to deal with redemption shocks is a recurring concern. The liquidity mismatch between these assets and the offer of daily redemptions was an inherent vulnerability that was often noted. While many bond funds had sufficient buffers to withstand redemption shocks, examples were also found of widespread liquidity shortfalls that could only be met by drawing down bank credit lines or selling assets.

MMFs are predominantly domiciled in jurisdictions allowing CNAV, so vulnerabilities seen during the GFC remain. Reviews of investor flows suggest that prohibition of CNAV-MMFs in some countries has primarily had the effect of diverting flows to MMFs to countries permitting and funds continuing to offer CNAV products.

LMTs are not always available or widely adopted. Tools like swing pricing, fees, gates, and side pockets provide mechanisms to manage redemption shocks without full redemption suspension. Not all regulatory frameworks permit fund managers use of all or most of these options and wide adoption is elusive in other markets where they are explicitly permitted. Guidance by authorities on their use is limited. In some countries, regulators lack legal powers to require LMTs to be included in funds' governing documents. In others, authorities do not have powers to trigger use of LMTs other than complete redemptions suspension.

Another common finding is that supervisory intensity on asset managers needs to be enhanced to ensure appropriate coverage of key risk areas. In some countries, this finding emerged in two consecutive assessments; in others, resources had simply been moved from other areas which were in turn being insufficiently supervised. This sug-

**Box 1. Asset Management: Overview of FSAP Findings *(continued)***

gests that the primary cause; viz., resource gaps in the securities regulation area created by broader mandates and the growth in scale and complexity of supervised activities since the GFC remain inadequately addressed. Moreover, in some countries, regulators also have insufficient autonomy to determine the necessary resources.

CHAPTER

# 3 Policy Options for Money Market Funds

*Key policy priorities include better alignment of investor incentives, strengthening MMF risk management and addressing market frictions. MMF-targeted options can be divided into those addressing strategic complementarities in investor redemptions and those increasing the range of funds' liquidity risk management tools (LMTs). More intrusive LMTs can be added for larger shocks or if runs do not abate in response to less intrusive options. Such a waterfall structure has two advantages. First, it can more effectively contain potential costs of reform and mitigate unintended adverse impact on functioning of short-term funding markets (STFMs). Second, it pushes the need for central bank emergency support farther into the tails of the shock distribution.*

## Motivation for Policy Action

Intense, sustained redemptions from non-government MMFs during March 2020 that ultimately took government intervention to stem raise questions regarding the adequacy of post-GFC reforms.[1] The 2020 crisis was an illiquidity episode, unlike 2008 when the Lehman bankruptcy resulted in the Reserve Prime Fund breaking the buck, an outcome that also threatened other prime MMFs. Post-GFC reform in the US focused on two key measures, both targeted at reducing bank-run like risk confronting prime MMFs. The removal of the CNAV structure for institutional prime MMFs was targeted at reducing strategic complementarities in investors' exit decisions.[2]

[1]Annex 2 details MMF policy reform undertaken in the European Union, Asian countries, and the United States after the GFC.

[2]CNAV MMFs seek to maintain an unchanging face value NAV (for example $1/€1 per unit/share) with assets generally valued on an amortized cost basis. From an investor perspective, this makes CNAV MMF shares isomorphic to demand deposits from a safety of capital preservation perspective (in normal times). Absent deposit insurance-like protection, however, it opens up CNAV MMFs to strategic complementarity driven redemption runs (Diamond and Dybvig 1983).

An additional option allowed MMFs to charge exit fees and gate redemptions temporarily if sustained runs forced liquidity buffers below a pre-announced threshold.[3] IOSCO's 2012 recommendations for MMFs sought to address key financial stability risks, focusing on five issues: CNAV; strategic complementarities; discrepancy between published NAV and market value of assets; implicit support; and credit ratings. Implementation assessments starting in 2015 showed important progress, with IOSCO's 2020 thematic review finding implementation in most jurisdictions as "fully consistent" with its 2012 recommendations.[4]

## Targeting Investor Incentives, Risk Management, and Market Frictions

Policy reform needs to target three critical issues for non-government MMFs. First, given persuasive evidence pointing to strategic complementarities as the primary driver of the redemption spike in institutional prime MMFs, first-exit incentives need to be addressed. Second, containing the risks from MMF liquidity transformation while minimizing unintended adverse impact on STFM functioning. Third, directly addressing the liquidity deficit in core important STFMs that are critically dependent on MMFs.

Strategic complementarities are best addressed by decoupling gates and fees from observable liquidity thresholds and by removing CNAV structures for all prime MMFs.

- For the MMF sector, the March 2020 episode was a redemption run on institutional prime funds. Tying redemption fees and gates to observable breaches of hard liquidity thresholds inadvertently provided illiquidity averse institutional investors a coordination device that increased first-mover exit incentives. This was the opposite of what was intended. Institutional prime MMF managers reported outflows accelerating sharply as weekly liquid assets (WLA) started decreasing, especially after it fell below 35 percent indicating that investors perceived an imminent threat to liquidity access. Empirical evidence supports this market perspective. Li and others (2020) in a study covering US and offshore US$ institutional

[3]Specifically, if the weekly liquid asset (WLA) buffer share falls to below 30 percent of total net assets of the MMF, where WLA includes cash, US Treasury securities, certain other government securities with remaining maturities of 60 days or fewer, and securities that convert into cash within one week. See: https://www.sec.gov/news/press-release/2014-143. European rules also define a specific threshold at which a fund's board of directors may consider applying a fee or gate (30 percent weekly liquidity), followed by another threshold at which the fund must apply a fee or gate (10 percent weekly liquidity). The United States also has an additional 10 percent WLA tier rule.

[4]IOSCO (2012). Participating jurisdictions included Brazil, China, France, India, Ireland, Japan, Luxembourg, the United Kingdom and the United States, together representing 95 percent of the total net assets managed by MMFs worldwide.

prime MMFs show: (1) WLA positions, which were insignificant in driving investor flows before March 9 (that is, normal times), became their most significant determinant during March 9–23 (that is, stress); and, during the crisis, (2) outflows were significantly greater for funds with WLA below the sector median than for those above; and (3) sensitivity of outflows increased sharply once WLA fell below 40 percent. Importantly, Li and others' empirical strategy identifies the coupling of gates and fees to an observable WLA threshold as the key driver of redemption runs rather than MMF illiquidity itself. Neither were WLA positions significant in driving redemption runs of the GFC era, nor did MMFs with lower daily liquidity buffers suffer worse redemptions during March 9–23, 2020.[5]

- CNAV structures generate strategic complementarities incentivizing early investor exit. A low hanging fruit is to mandate that all prime MMFs be structured as floating NAV vehicles, or equivalently, converting prime MMFs into short-term investment funds with open-ended structures. For example, in the United States, this would entail extending floating NAV to cover retail prime MMFs in addition to institutional prime MMFs which moved away from CNAV in 2016. Implementation of this change may have material impact on liquidity driven MMF investors outside the United States because MMF shares will likely lose their cash-equivalent status.[6]

Liquidity transformation related risks are best addressed by increasing the range and flexibility of LMTs mandated or available to MMF managers and arranging them in a waterfall structure. Mandatory daily dealing and T0 settlement makes liquidity transformation a key service provided by prime MMFs, vital to supporting commercial paper (CP) and certificates of deposits (CD) markets. While the preceding set of policy options can be effective in purging bad coordination runs generated by strategic complementarities, they may not be so effective in stemming runs driven by large shocks to fundamentals or by uncertainty. Mandating or providing for a waterfall of LMTs can be an especially effective complement, with fund managers using specific tools sequentially, in isolation and in combination, depending on the severity of shocks and redemptions.

- A *first line of defense* would be to mandate maintenance of adequately high asset-side liquidity in normal times and provide flexibility within this mandate for temporary deviations of liquidity buffers when MMFs are con-

[5]Robustness checks showed the insignificance of other potential redemption drivers in last year's events, including the degree of investor sophistication, availability of (bank) sponsor support, and factors that were important in 2008, such as MMF performance and the degree of their exposure to less liquid assets (long-term debt).

[6]The US impact will be less significant since only retail prime MMFs have CNAV structures now.

fronted with severe shocks. The March episode highlights that a 30 percent WLA floor may be insufficient and mandating an increase to a higher level during normal times is desirable. In order to more definitively remove the association of gated liquidity with a hard, WLA buffer floor during stress events, regulators should consider allowing MMFs to temporarily breach the buffer floor during such periods provided that any new liquidity from inflows or maturing portfolio holdings are placed into overnight sovereign debt repo until the buffer floor requirement is successfully met again.[7] This also ensures a better distribution of implied costs across investors and CP issuers. A higher WLA floor in normal times reduces liquidity transformation, and hence, may penalize yield sensitive MMF investors and CP issuers. A countercyclical WLA floor would not only benefit liquidity driven investors, but also provide better protection against asset fire-sales which benefits all investors and issuers in STFMs.

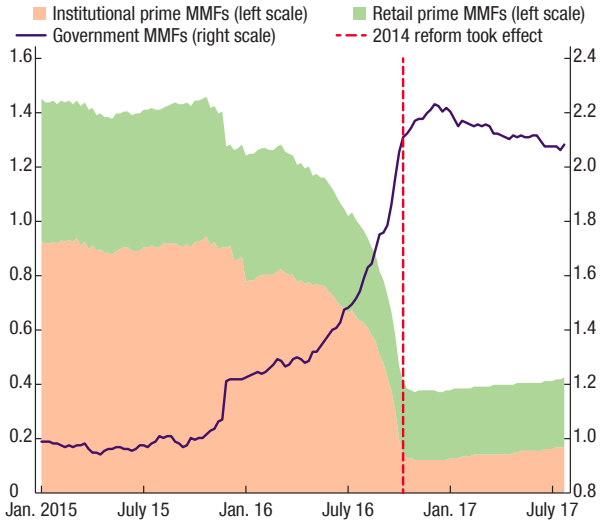
- A *second line of defense* would be to allow fund managers to use LMTs that serve to either delay redemptions or to reduce investor incentives to sell-off MMF shares. Swing pricing, discussed in the next chapter, is a potential option here—it has had success in stemming investor runs on U.K. corporate bond OEFs in the past (Jin and others 2019) and works by increasing the option value of delay thereby weakening strategic complementarities in exit. However, it is less likely to be a viable option for MMFs who are subject to immediate settlement. An alternative is to implement a *minimum-balance-at-risk* (MBR) requirement, wherein a portion of each shareholder's recent balances at the MMF is available for redemption only with a time delay to ensure that redeeming investors remain partially invested in the fund over a certain time period. This reduces redemption pressure and the likelihood of suspensions.
- A *third line of defense* is to allow MMFs the option to offer redemption-in-kind if liquidity buffers fall to levels significantly below the current 30 percent buffer floor. This option offers the advantage of preserving liquidity from being eroded below critically low levels and stems first-mover advantage driven redemption demand for liquidity. Practical implementation may require statutory or regulatory changes or an adequate transition period since not all MMFs are able to offer redemptions-in-kind. This option is unavailable to retail prime MMFs.
- A *final line of defense* would be to allow MMF managers to temporarily gate redemptions, but that would have to be done industry wide, triggered by supervisory or automatic actions. Given the extremely intrusive nature

[7]Other variations have been discussed, for example, adjusting the buffer to the share of institutional investors in the fund. These may have merit also, but their complexity could impose costs on both the industry and supervisors. Hence, it is preferable to proceed by strengthening existing buffers before assessing the merits of other mechanisms.

of this intervention, similar to a bank holiday, it should only be put into action at time of extreme distress, for short periods of time such as a day, with clear ex-ante guidance around when such an action may be taken.

**Figure 5. Assets Managed by Prime MMFs (January 2015–July 2017**

*(Total net assets, in trillions of US dollars)*




Sources: Bloomberg Finance L.P.; and Investment Company Institute.
Note: MMFs = money market funds.

Identifying and deploying a combination of LMTs in such a waterfall structure is more likely to be effective in minimizing costs on investors and on STFMs. This reflects three factors. First, in tandem with policies mitigating strategic complementarities in exit, they reduce the likelihood of runs and associated losses, thereby increasing investor returns in bad states of the world. Second, since runs are less likely, LMTs that are costlier for investors and markets within the waterfall, such as MBR, redemptions-in-kind and gates are unlikely to be deployed. Third, the waterfall is structured to distribute costs across different types of investors in prime MMFs. Increasing WLA requirements lowers liquidity transformation. Making them countercyclical means liquidity remains accessible for longer under stress. Both are beneficial for investors that prioritize liquidity, such as those constrained to invest in cash-equivalent instruments. Countercyclical WLA buffer floors additionally provide fund managers more headroom against fire-sales of less liquid assets, thereby cushioning NAV, which is valuable for yield-sensitive investors and market issuers.[8] Similarly, LMTs lower down the waterfall (for example, MBR, redemptions-in-kind, gates) are valued more by yield-sensitive, buy-and-hold investors.

Notwithstanding the fact that the preceding measures materially raise the resilience of prime MMFs, viable liquidity backstops should be explored.

[8]Chernenko and Sunderam (2019) show in the context of equity mutual funds that provision of incentives to fund managers to internalize fire-sale externalities increases their holdings of cash buffers and their use in meeting redemption spikes. Raising prime MMF WLA buffers and making them countercyclical would serve the same purpose.

Despite the waterfall design attenuating costs to investors and markets, some adjustment of liquidity pricing and returns and outflows from prime MMFs can still be expected. Previous US reform was a major factor incentivizing a $1 trillion outflow from prime to government MMFs (Figure 5). Hence, the following measures should be considered:

- *Dealers running CP programs could be encouraged to explore options to support STFM resilience, including committing to repurchase in secondary markets and extending committed repo lines to prime MMFs.* A significant benefit of such private sector arrangements is that they can reduce moral hazard by weaning MMFs, investors and markets off central bank support except in tail episodes. Erecting more reliable market liquidity backstops may entail some increase in issuance costs reflecting dealers' balance-sheet and risk management constraints but would also bring financial stability benefits. An important lesson from the 2020 episode is that dealers cannot be expected to absorb very large and discrete increases in liquidity demand such as those seen in the CP market. However, pre-commitments of liquidity provision are likelier to pass muster with internal risk management criteria at a cost that can also be borne more readily by issuers during normal times as opposed to during times of stress.
- At the end of the waterfall of options, system wide considerations would argue for central banks to provide liquidity to the MMF sector during tail episodes. The effectiveness of central bank emergency support is underscored by Li and others' (2020) analysis of the impact of the Federal Reserve's MMF liquidity facility launched on March 23, 2020. In the two weeks that followed, redemption runs at institutional prime MMFs reversed, with the greatest benefit accruing to funds with the lowest WLA buffers. Central banks do not interact directly with most NBFIs in normal times since they wish to avoid disintermediating markets, preferring to support and preserve dealers' capacity to provide liquidity to NBFIs, besides precluding moral hazard. However, in times of extraordinary stress, where the above mentioned MMF-LMTs and strengthened dealer backstops fail to stem the tide, emergency arrangements established in advance by central banks could be implemented quickly. Moral hazard can then be managed through risk pricing, commitment fees and regulation. Pricing access to central bank liquidity at rates equivalent to credit standing facilities or the discount window can cement such operations as backstops for times of stress. Facilities can charge fees to issuers for inclusion as eligible collateral to target liquidity support and avoid over-reliance and MMFs can be charged ex-ante commitment fees in return for access to better align investor incentives for liquidity with MMF asset allocations.[9]

[9]Access to central bank facilities to government MMFs is less susceptible to moral hazard and faces less ambiguity concerning its net welfare implications.

Several other measures have been proposed to support greater resilience of MMFs.[10] Reforms targeting the asset side of MMFs aim to ensure more liquid portfolios and reduced asset-liability mismatch, including by tightening maturity thresholds and imposing limits on the proportion of the portfolio that can consist of less liquid assets. Other options for improving the regulatory framework concern the parameters within which MMFs operate or other constraints to which they are subject, such as stress testing carried out by MMFs or by the supervisor. Finally, scope exists for exploring whether accounting standards may exaggerate procyclicality of flows of certain institutional investors and if this could be subsequently attenuated. Such investors may be subject to debt covenants mandating certain levels of cash equivalents in their portfolios. Under *normal* market conditions, the US and international accounting standards recognize MMF instruments as cash equivalent but, given uncertainty about the tenability of such accounting treatment during times of stress, investors appear loathe to risk triggering debt covenants.[11]

## Policy Implementation—Scope and Sequencing

For policy reform to be effective, globally coordinated, industry-wide implementation of a key set of options is essential. The combination of policy options described above, or equivalent set of measures, would require broad-based implementation. Fund managers and investors have considerable flexibility in moving business operations and capital across jurisdictions. Consequently, without consistent and time-bound implementation in at least the major home jurisdictions of MMFs, policy options may not be effective in supporting financial stability and new shock spillover/transmission channels could open up. Similar considerations would argue for broad coverage across the prime MMF universe.

On sequencing, policy options can be categorized into quick wins (immediately implementable), incremental steps building on existing international

[10]Annex 3 contains a detailed summary of several proposals. See also US Department of the Treasury (2020) and FSB (2021).

[11]For example, US Generally Accepted Accounting Principles includes MMFs as an example of a cash equivalent exposure and the US Securities and Exchange Commission has clarified that this treatment extends to MMFs that have the ability to gate or penalize redemptions under normal market conditions. In the EU, IAS 7 defines cash equivalents as "short-term, highly liquid investments that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value." The French Accounting Standards Authority and the Autorité des Marchés Financiers (Financial Markets Regulator) clarified that funds authorized under the MMF regulation would benefit from a presumption of eligibility for classification as cash equivalents, albeit acknowledge that this "presumption of risk negligible variation in the value of these funds can be refuted in view of the facts and circumstances relating to market developments, especially in times of stress."

standards and best practices (short-term), and major reforms (medium-term). Such a phased approach allows for an assessment of the impact of initial reforms before proceeding to more extensive changes and for significant measures that are likely to have a major industry or STFM impact to be introduced gradually, over lengthy transition periods.

- *Quick win options* that could be immediately implemented include decoupling regulatory thresholds from fees and gates while continuing to allow fund managers to gate redemptions and charging exit fees at critically low buffer floor levels; giving regulators and investors a clearer picture of developments by closing data gaps, thereby allowing earlier trend identification via an enhanced reporting framework developed on a harmonized basis across major jurisdictions; and helping identify vulnerabilities and risks before they crystallize by mandating improved stress testing by MMFs on the basis of regulator approved, common parameters.[12]
- *Incremental steps* to be implemented in the short-term, including system-wide stress testing by authorities, facilitated by enhanced reporting frameworks implemented in the earlier, quick win phase, combined with tying supervisory actions, for example, oversight intensity, to outcomes;[13] rolling out liquidity management lines of defense (mandatory strengthening of WLA buffer floor for normal times with in-built flexibility for crises, MBR, and redemption-in-kind) and other liquidity management tools, such as limits on eligible assets for non-government MMFs; and greater clarity regarding sponsor support.
- *Major reforms* to be implemented in the medium-term, including limiting CNAV to government MMFs and any additional constraints or prohibitions on daily dealing for prime MMFs.

[12]Building on IOSCO's *Recommendation 8*—MMFs should periodically conduct appropriate stress testing.

[13]See Recommendations of the most recent FSAPs of the United States (2020) and Ireland (2016). Eventually, given the extensive cross-border nature of the business, global top-down stress tests utilizing harmonized data reporting would be a useful add-on to national stress tests.

CHAPTER

# 4 Policy Options for Open-End Funds

*As with prime MMFs, OEF-targeted options address strategic complementarities driving investor runs and those increasing the range and scope of their LMTs arranged in a waterfall structure. Absence of T0 settlement enables use of price-based incentive schemes to mitigate strategic complementarities, albeit, design and operational complexities need to be fully understood. While arranging LMTs in a waterfall would make them more effective, the ability to prescribe options within a narrow perimeter is constrained by the wider set of asset classes, fund structures and investors relative to MMFs.*

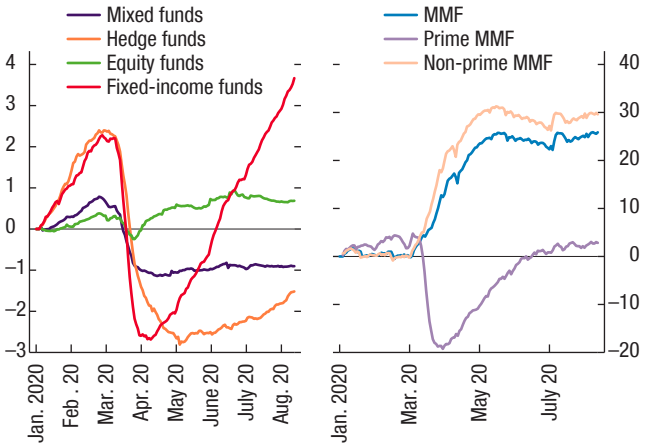
## Motivation for Policy Action

While not as severe as prime MMFs, outflows from fixed income funds, especially corporate and EMDE bond funds faced outflows in H1–2020 that were unprecedented in historical terms. Outflows from US fixed income funds amounted to $481 billion during the March sell-off (IMF 2019; Figure 6, panel 1), and outflows from local currency EM sovereign bond funds continued well into Q2–2020. The broad deterioration in the market liquidity of funds' assets was particularly severe at those OEFs facing larger outflows (Figure 6, panel 2). Fixed-income funds attempted to use a *liquidity waterfall* strategy, to initially meet increased redemption demand using cash and cash equivalents but were unsuccessful, forcing them to ultimately fire-sell bonds into illiquid markets (Figure 6, panels 3 and 4). The resulting NAV erosion fueled further outflows creating a vicious circle of falling NAV and redemption pressure, reflected in the larger increase in bid-ask spreads of bond assets of OEFs facing more redemptions (see Figure 8, panel 2) and experiencing greater NAV erosion (Figure 7). The March episode was short-lived but highlighted the importance of run-driven amplification,

## Figure 6. Fund Flows (Q1–Q2) and Liquidity Management by Fixed-Income Funds (2019–20)

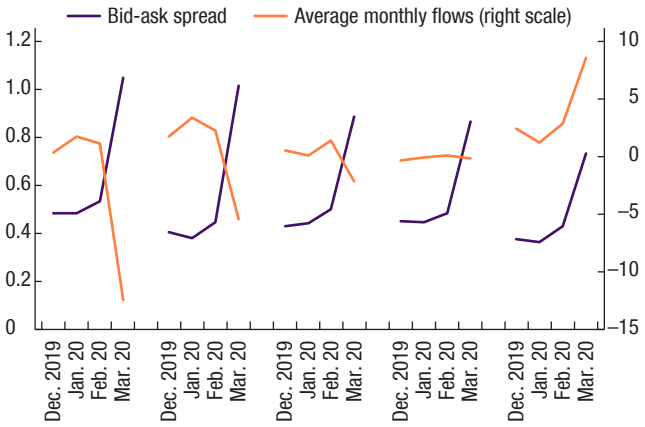
*In March most fund sectors faced large outflows.*

**1. Cumulative Daily Net Flows into Funds (Relative to January 2, 2020) (Percent)**



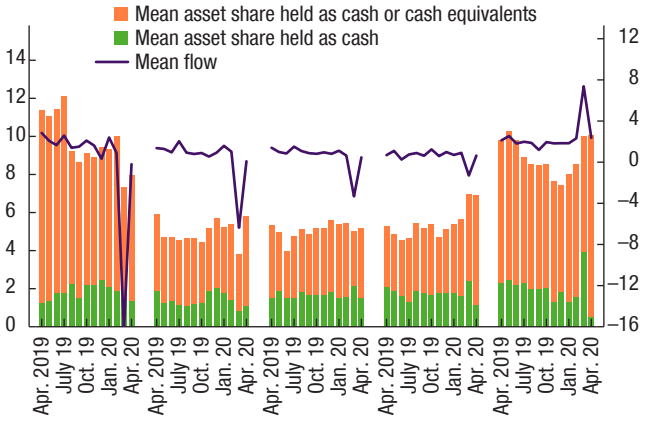

*Portfolio liquidity deteriorated in proportion to outflows.*

**2. Bid-ask Spread of Fixed-Income Funds by March 2020 Flow Quintile, January 2020–May 2020 (Percent)**



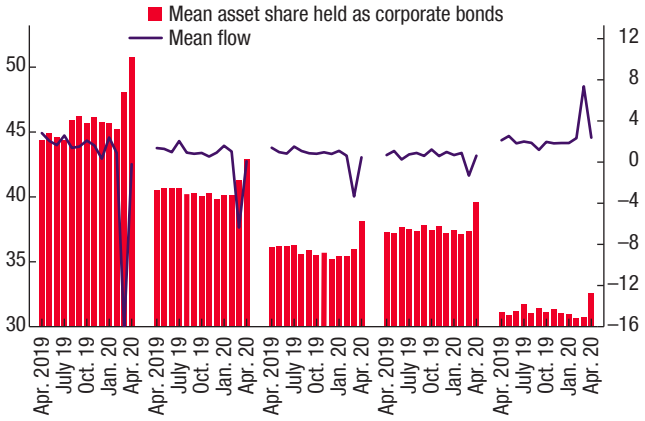

*Bond funds met outflows by selling cash and cash equivalents ...*

**3. Holdings of Cash and Cash Equivalents (Left Scale) and Fund Net Flows (Right Scale) by March 2020 Flow Quintile, Fixed-Income Funds (Percent of assets under management)**




*... thereby mechanically increasing exposure to corporate bonds.*

**4. Corporate Bond Holdings (Left Scale) and Fund Net Flows (Right Scale) by March 2020 Flow Quintile, Fixed-Income Funds (Percent of assets under management)**

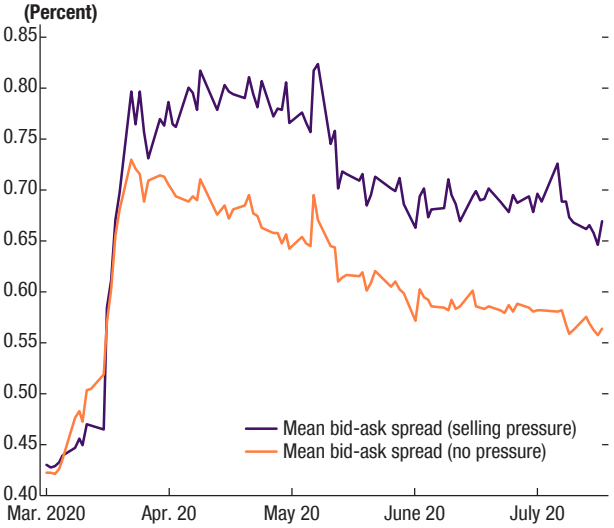



Sources: Board of Governors of the Federal Reserve System; Morningstar; and Refinitiv Datastream.
Note: Panel 1 shows asset-weighted average cumulative daily net flows for other economic flows larger than $½ billion and all money market funds (MMFs) and open-end hedge funds with alternative strategies larger than $50 million. Coverage at the end of June 2020 is of 45 percent of equity funds, 43 percent of fixed-income funds, 30 percent of mixed funds, and 78 percent of MMFs reported by the International Investment Fund Association at the global level, including funds of funds. The sample covers the period January 1–August 12, 2020. Panel 2 shows value-weighted bid-ask (BA) spreads (left scale) and average net flows (right scale) by flow quintile. BA spreads are computed based on Refinitiv composite end-of-day bid and ask prices. Cash and cash equivalents are assumed to have no BA spread. Panels 3 and 4 show balanced samples of funds with assets more than $½ billion; that is, excluding funds that entered or exited during January 2017–April 2020. In panel 3, cash equivalents include US Treasury securities and other securities maturing in fewer than 92 days. The sets of funds reporting respective portfolio components differ, while the set of funds reporting flows remains unchanged.

**Figure 7. Selling Pressure and Fire Sales during and after March 2020**

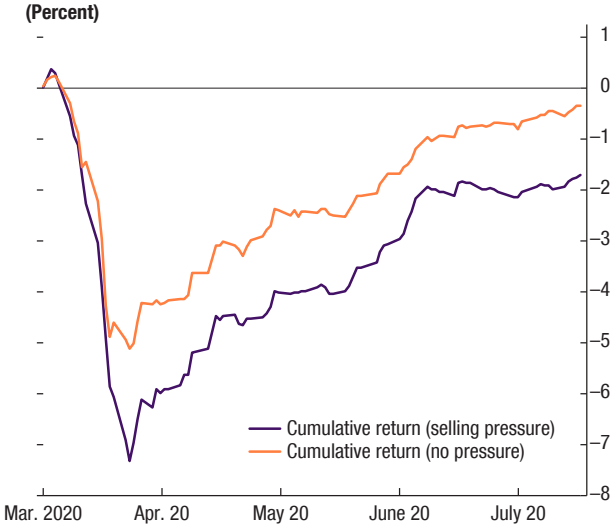
*Higher redemptions meant fewer liquid assets ...*

**1. Bid-Ask Spreads of Securities under Selling Pressure Held by Fixed-Income Funds**
**(Percent)**




*... and larger and longer underperformance.*

**2. Cumulative Returns of Securities under Selling Pressure Held by Fixed-Income Funds**
**(Percent)**




Sources: Morningstar; and Refinitiv Datastream.
Note: Panels 1 and 2 are based on portfolio holdings data for 390 fixed-income funds holding approximately 13,000 identifiable securities in March. Prices and bid-ask spreads are computed based on Refinitiv composite end-of-day bid and ask prices. Selling pressure during March is defined as the fraction of flow-motivated trading in a security's average monthly trading volume (Coval and Stafford 2007). Flow-motivated trading is the difference between a security's purchases by funds experiencing inflows higher than 90 percent of their peers and sales by funds facing outflows higher than 90 percent of their peers. A security experiences selling pressure if it is in the bottom decile of the inflow distribution and experiences no pressure if inflows are positive.

since only after central bank intervention did daily flows return to their pre–COVID-19 levels (Hespeler and Suntheim 2020).[1]

## Incentive Issues and Market Frictions Confronting OEFs

Policy targets are similar to those identified for prime MMFs, albeit, with important differences that reflect the wider sets of asset classes, fund structures and investors in the OEF universe. Most of the liquidity management challenges in this sector are concentrated in funds structured to deliver daily dealing and fast settlement to shareholders yet offering exposure to assets with low structural and highly procyclical market liquidity. This implies that despite floating NAV, *strategic complementarities generating first-mover incentives* for exit remain prominent for OEF investors as was the case in March 2020. Beyond policies mitigating bad coordination runs, the significant liquidity mismatch given underlying asset market frictions suggests the

[1]In the first half of 2020, mutual funds suspended withdrawals from funds with a total of $62 billion in assets under management, 0.11 percent of the sector's total assets. Of the funds that suspended redemptions, real estate funds were the most prevalent.

need and desirability of *expanding OEFs' LMTs to absorb fundamentals- and uncertainty-driven runs*, besides the conventional, but extreme option of redemption suspensions.

Properties of the OEF business model and key market frictions make LRM more challenging for OEFs, including by increasing investors' first-exit incentives. As noted in Chapter 2, the growing use of passive-index and benchmark-hugging-active investment strategies to invest in high-risk, low-liquidity assets increase first-exit incentives by increasing the likelihood of fire-sales under stress. In such an environment, certain market frictions render LRM more challenging. First, the low depth of domestic financial markets decreases the liquidity of EMDE securities and makes it more procyclical. Second, variation in OEFs' cash holdings across asset classes suggests that fire-sales may be more preferred as a strategy to deal with redemption spikes by fund managers in municipal and speculative-grade corporate bonds and in syndicated loans (Chernenko and Sunderam 2020). Third, large direct and indirect holdings of corporate bonds by ratings-sensitive investors like (life) insurers can, due to fire-sales, significantly increase procyclicality of corporate bond market liquidity and OEF NAV, besides generating first-exit incentives for remaining investors (Eom and others 2004; Ambrose and others 2009; Ellul and others 2011; Huang and others 2016; IMF 2016a; Ellul and others 2018). Fourth, market-making by bank dealers has decreased significantly after the GFC due to a combination of enhanced regulation and risk management (Adrian and others 2017) and this liquidity provision appears to under maximum pressure when the market needs it most.[2]

## Addressing Strategic Complementarities Using Swing Pricing

Swing pricing facilitates internalization by investors of externalities imposed on OEF NAV by their decisions to purchase and redeem fund shares. By increasing the subscription price above prevailing NAV for inflows and lowering share redemption value below NAV for outflows, swing pricing can be a powerful means of shielding shareholders remaining invested in the OEF from transaction costs and NAV externalities from entering and exiting investors. Hence, swing pricing allows fund managers to provide countervailing incentives against first-mover gains by increasing the option value of waiting relative to immediate redemption (Zeng 2018; Capponi and others forthcoming).

Recent empirical evidence points to its potential effectiveness in stemming runs, albeit, adoption experience has been mixed, potentially suggesting

[2]Bao and others (2018) attribute this to the implementation of the Volcker Rule rather than other elements of Basel III.

the necessity of regulatory intervention. Jin and others (2019) showed that fixed-income OEFs using swing pricing saw significantly reduced outflows in the United Kingdom during past stress episodes. However, US fund managers have not availed of the option despite obtaining regulatory permission in 2018, nor have European OEFs in all jurisdictions. This hesitation suggests that besides complexities in design and operation (see next paragraph), competitive pressures reflecting risk of deterring investor flows from unilateral adoption may be important.[3] If so, this may argue for introduction via regulation to guarantee industry-wide adoption. For example, even in the high-pressure situation of March 2020, it was the Luxembourg Commission de Surveillance du Secteur Financier (CSFF) that increased swing adjustment factors beyond levels previously specified in funds' prospectuses.[4]

Full understanding of design and operational complexities is vital to successful implementation. An example is the choice between partial and full swing pricing. Consider a shock that does not trigger the swing mechanism under a partial regime, but nonetheless significantly increases uncertainty regarding future asset returns and correspondingly, the near-term likelihood of swing dilution and NAV erosion. This lowers the option value of delaying exit and increases strategic complementarities sufficiently to trigger a run. In this case, swing pricing is structured in a manner that fails to assure investors that others will not run to redeem for moderate shocks. One important lesson is that for swing pricing to work, it must remove strategic uncertainty about other investors' actions regarding immediate exit.[5] A few other design complications suggested by existing theoretical studies include: (1) determination of a sufficiently large dilution factor when the swing mechanism is triggered, as otherwise investors fearing larger future dilution due to further redemptions may coordinate on an immediate run; (2) dealing with disadvantages of publicly known triggers for swing pricing activation—tying prime MMF gates and fees to known WLA thresholds facilitated bad coordination, suggesting a potential trade-off between transparency and stability in the design of mechanisms to improve coordination outcomes (Gale 1995; Surti 2004); (3) the need for, and challenge of, more prescriptive supervisory guidance for stressed periods. Other practical challenges include accounting for expected liquidity conditions in securities markets (as opposed to own-fund flows alone) when setting swing parameters, which may make it difficult for managers to

[3]Operational factors have been cited as a material factor impeding use by US OEFs. (https://www.sec.gov/rules/final/2016/33-10234.pdf) while regulatory proscription may be a factor in countries like Germany.

[4]https://www.cssf.lu/wp-content/uploads/FAQ_Swing_Pricing_Mechanism_230320.pdf

[5]Conceptually, designing swing pricing optimally is a problem of Bayesian (persuasion) mechanism design, to neutralize value destroying strategic complementarities. See Kamenica and Gentzkow (2014) and Goldstein and Huang (2016).

accurately calculate expected trading costs, especially during periods of severe market stress.[6]

## Policy Options to Enhance OEF Liquidity Risk Management

As with (institutional) prime MMFs, an effective approach would be to mandate or make available a waterfall of LMTs to OEFs. Evidence from FSAPs suggests room to further improve and expand availability of LMTs to fund managers, including importantly, by ensuring this option is reflected in the relevant laws and regulations.[7] Since the root cause of the problem is the mismatch between daily dealing and structurally low or procyclical asset liquidity, options on an ascending scale of intrusiveness would include the MBR (moderate shocks), redemption-in-kind[8] (moderate-to-large shocks), and temporary gates (large shocks). A consultative process can help authorities determine the exact mix of LMTs along the waterfall given that fund managers are well-placed to advise on their portfolios' liquidity risks which could assist in identifying tools most appropriate for use in specific situations. Regulators should ensure that appropriate LMTs are allowed for individual OEFs in their documents of incorporation and provide sufficient guidance to managers on their expectations regarding the use of these tools.

Directly aligning redemption frequency with the liquidity of underlying assets at the fund's initiation may be particularly effective and deserving of supervisory attention. The IOSCO LRM recommendations discuss using the design phase to ensure that OEFs can meet redemption obligations.[9] When choosing a structure offering frequent redemptions to invest in illiquid assets such as infrastructure and real estate, IOSCO recommends a justification be provided via a documented assessment. Consideration should be given to going beyond this. A more conclusive recommendation on moving away from daily liquidity for funds investing into illiquid assets, which may require amending legal frameworks in some countries, could materially improve LRM.[10] In this regard, limiting redemption frequency at the initiation stage

[6]To avoid setting swing factors too low, funds could be asked to take market-wide redemption and liquidity conditions into account when calibrating the size of the swing factor. And supervisory action may be required to ensure coordinated and universal adaptation by the industry of this practice.

[7]See, for example, IMF (2016b, 2016c, 2017, 2018, 2020b, 2020c). Currently, Recommendation 17 in the IOSCO Recommendations for LRM states that "responsible entities should consider the implementation of additional liquidity management tools to the extent allowed by local law and reglation."

[8]OEFs dedicated to insurance products (for example, variable annuities) may be more flexible in terms of redemption, including redemption-in-kind, as insurers are less likely to face significant redemption pressure.

[9]See Annex 4.

[10]This could possibly be done in combination with fostering secondary markets for fund shares to allow investors access to liquidity even if redemptions are restricted. For example, while secondary market trading activity in German open-end real estate fund shares seems to have been very limited in the past, it has been

itself when investing in illiquid assets may be particularly effective in managing investor expectations about their liquidity risks well beyond the potentially complex details in the funds' prospectuses. An added advantage is the improvement in supervisors' oversight of OEFs' LRM since they must undertake intrusive and detailed discussions with managers on the consistency between the liquidity of the targeted asset portfolio and desired redemption frequency of funds' units at the time of fund registration.

Enhancing reporting and disclosure practices in relation to OEFs' liquidity is vital. This ensures continuous visibility of the LRM frameworks, practices, and challenges to relevant stakeholders. Supervisors need adequate information about OEF portfolios to assess how their liquidity will vary with market conditions and investors need adequate information to determine whether the portfolio's liquidity profile matches their risk appetite. IOSCO's LRM recommendations offer a comprehensive discussion of the desirable attributes of OEF disclosures. Experiences from jurisdictions implementing this reporting framework will be helpful in determining its ability to facilitate enhanced oversight of OEF liquidity by investors and supervisors.

## Addressing Leverage Related Vulnerabilities in the OEF Sector

High leverage can increase fire-sale amplification risk, but a proper vulnerability assessment can be conducted only after data gaps are closed. Available evidence suggests that some OEFs may be using significant leverage in their portfolios. The top quartile of a sample of 200 OEFs with combined asset holdings of $1½ trillion had gross notional derivatives positions of 300 to 2800 percent of assets as of 2020 and funds reporting adequate details in 2017 appeared to be using derivatives to boost returns rather than purely for hedging. However, reporting is incomplete and inconsistent and obtaining a full picture on derivatives leverage is important because it is critical to assess funds' sensitivity to large moves in risk factors related to rates and credit market exposures.

Putting in place arrangements for supervisors to obtain regular information on leverage, including prescribing uniform methodology for its measurement is a priority. Regulatory frameworks should embed adequate requirements regarding reporting, data analysis, monitoring, and disclosures. Implementing comprehensive and globally consistent reporting standards across the asset management industry would give regulators better data with which to locate leverage risks. *As a first step, implementation of IOSCO's Leverage Framework* would provide for improvements to the visibility of leverage by

increasing following the introduction of minimum holding periods and mandatory notice periods in 2011 (Gerlach and Maurer 2020).

enabling aggregation and providing additional information on leverage for funds in jurisdictions currently not making this information publicly available. *Subsequently, targeted enhancements of this framework could significantly increase comparability across jurisdictions*. While the current framework details different measurement options for fund leverage, it does not imply adequate data comparability across jurisdictions (netting and hedging); nor consistent availability of information (on gross and net leverage and through stress tests) which can help investors understand portfolio risks better than information currently disclosed in prospectuses. Regulators will benefit from the experience of those peers that currently require regular portfolio data reporting, including on derivatives and this can also guide global approaches developed by IOSCO.[11]

## Supervisory Resourcing Must Keep Pace with Mandates and Complexity

Ensuring supervision is commensurate with the risks to financial stability is key. Adequately monitoring OEFs' LRM frameworks and leverage levels is resource-intensive. Evidence from FSAPs points to under-resourcing at supervisory authorities as a key challenge, including in major markets. To obtain a sector-level view of risks, regulators need to have adequate visibility of liquidity and leverage of OEFs they supervise through the receipt of timely and sufficiently granular information that can be analyzed by in-house experts. Supervision should also ensure OEFs use their LRM framework and tools appropriately, starting with a discussion with managers regarding supervisory expectations at the fund initiation stage. For many securities regulators, this may require a significant increase in resources given the complexity of the markets and funds they supervise. Resource allocation to supervise the sector should continue to grow in line with the sector's impact on macro-critical risk.

[11]The United States has recently amended rules on use of derivatives by investment funds and improved reporting via Form N-PORT (including monthly portfolio composition), which should provide an enhancement in data collection and oversight. For the European Undertakings for the Collective Investments in Transferable Securities (UCITS) market, detailed reporting requirements are in place only on a selected basis in some countries and there is no EU-wide reporting framework. The European Securities Markets Association's guidance on UCITS use of leverage requires funds to choose between specific methodologies and to disclose—via prospectus and annual reports—the expected level of leverage. The IMF's *Financial Soundness Indicators Guide* (2019) represents a step in this direction, presenting a uniform measurement methodology for key financial indicators for MMFs.

CHAPTER

# 5 The Role of Investment Funds in Cross-Border Spillovers

*Since the GFC, benchmark-driven asset managers have intermediated a remarkable surge in cross-border portfolio flows into EMEs and frontier markets. The symbiotic potential is tremendous: growth benefits for recipient countries and higher returns and portfolio diversification of international investors. To secure these gains, it is important to guard against cross-border spillover of stress and market volatility that can exacerbate pre-existing vulnerabilities in recipient countries. To do so, policies can be deployed at both the source and receiving ends to mitigate capital-flow volatility and better manage volatility and market stress.*

Foreign participation in emerging and frontier markets has grown significantly since the GFC (IMF 2020a; Figure 8, panel 1), supported by liberalization of domestic financial markets, accommodative AE policies and persistent search for yield. The median EM portfolio debt stock is now above a quarter of GDP in comparison to 11 percent of GDP in 2008 and median EM portfolio equity stock has almost doubled since 2008 (IMF 2020a; Figure 8, panel 2). Surging capital inflows intermediated by OEFs have been a critical driving force behind this growth in EM and frontier financial markets. Estimates suggest that of the $900 billion cumulative inflows into EM sovereign debt since 2009, about 75 percent were intermediated by the OEF sector (Figure 8, panel 3). The proportion of foreign NBFI investors more than doubled since the GFC (Figure 8, panel 4).[1]

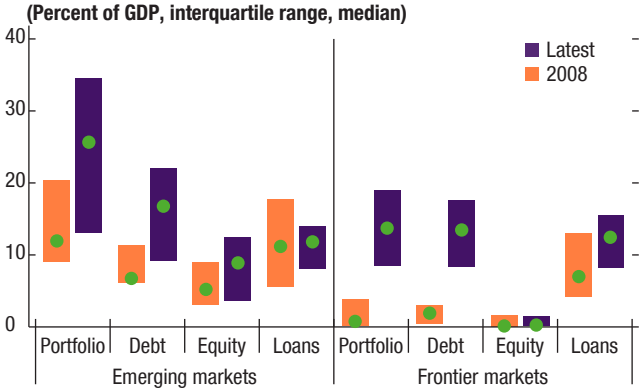
The potential for cross-border spillovers to EMDEs is analyzed relative to the type of investment funds intermediating capital flows since the nature and strength of shock transmission will depend upon the investor base and investment strategies. Parts A and B of this Chapter detail the trends from bench-

[1]These trends vary across countries, with foreign non-bank investors accounting for almost 50 percent of the total investors in some countries, such as Peru and Uruguay, while they are relatively marginal in China and India (Figure 8, panel 5).

## Figure 8. Rising Role Played by Cross-Border Nonbank Investors in Emerging Markets

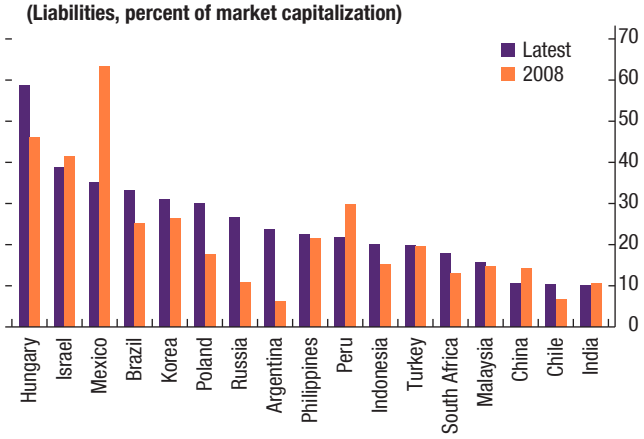
*Portfolio investment has grown for most emerging and frontier market economies, led by debt flows.*

**1. Portfolio and Cross-Border Loan Liabilities IIP**
**(Percent of GDP, interquartile range, median)**



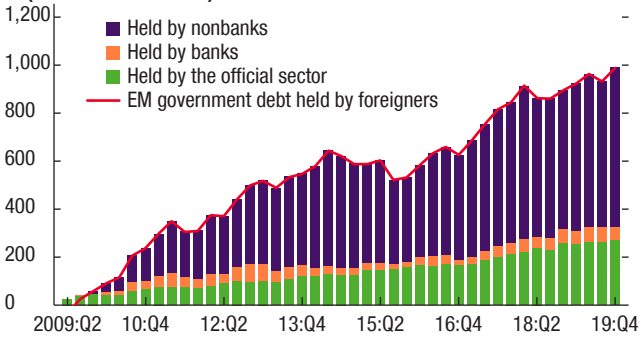

*However, foreign participation in equity markets is also significant in some emerging market economies.*

**2. Equity International Investment Position**
**(Liabilities, percent of market capitalization)**



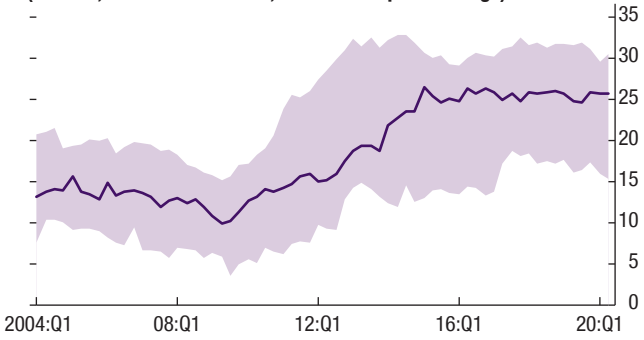

*Foreign nonbank investors have had an increasingly important role in external financing to EMs ...*

**3. Cumulative Foreign Flows to EM Sovereign Debt Markets**
**(Billions of US dollars)**



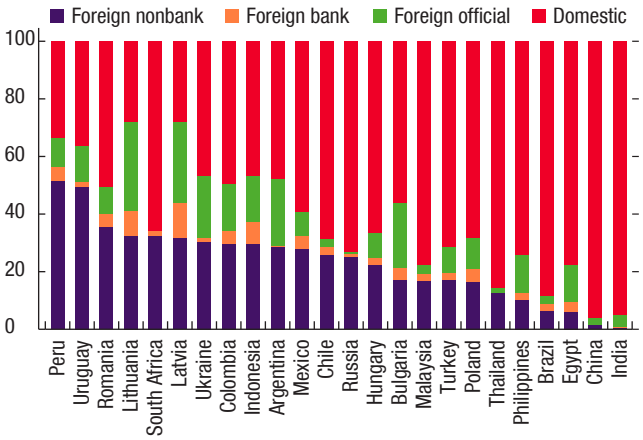

*... and now account for a significant proportion of the sovereign debt in emerging markets.*

**4. Cross-Border Nonbank Investors as a Percent of Total Investors**
**(Percent; dark line is median; area is interquartile range)**



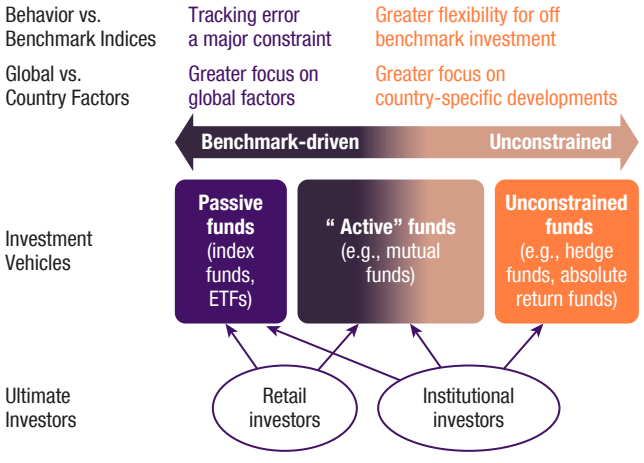

*There is a significant variation with Peru, Uruguay, and Romania having the highest foreign NBFI ownership.*

**5. Debt Ownership with Domestic and Foreign Investors (As of 2020:Q2)**
**(Percent)**




*Schematic: Breakdown of cross-border investors into benchmark-driven investors and unconstrained investors.*

**6. Type of Cross-Border Investors in EMs**




Sources: Arslanalp and others (2020); Arslanalp and Tsuda (2014, updated); Bloomberg Finance L.P.; Haver Analytics; IMF (2019); IMF, *World Economic Outlook*; and IMF staff illustration.
Note: IIP = International Investment Position.

mark driven investors (BDIs) which have risen significantly. These investors are relatively passive in their investment strategy and are exposed to significant contagion and idiosyncratic risks. Part C of this Chapter analyzes trends in unconstrained investors which are more active in their investment strategies and are more prone to concentration risk. We argue that both sets of investors have a unique role to play in the ecosystem and also expose EMDEs to unique risks that need to be carefully monitored and regulated.

## Benchmark Driven Investors: Increasingly Important for Emerging Market and Developing Economies

BDIs are among the most prominent drivers of this trend. They account for about 40 percent of the foreign investor base in EMDE sovereign debt. BDIs use benchmark indices to guide their portfolio allocation, varying in the degree to which they track the underlying benchmarks with the general goal of outperforming them. This last feature distinguishes them from passive OEFs that aim to exactly replicate benchmark performance (Figure 8, panel 6).[2]

The quantum of funds intermediated by BDIs has more than quadrupled in the past 10 years (Figure 9, panel 1).[3] The rising role of benchmarks has come in-step-with the doubling of the number of countries in the main EM indexes (EMBIG) since 2007 to their current level of 70. The growing size and liquidity of local bond markets in many emerging markets have allowed the number of countries in the main local-currency bond index (GBI EM) to increase from 12 to 18 (Figure 9, panel 2). The share of purely passive OEF investors has also increased even if it remains low compared to the share in developed markets (Figure 7, panel 3; IMF 2019).

Importantly, the universe of BDIs extends beyond the realm of passive funds, to also cover so-called "active" funds. Managers of "active" funds are evaluated against widely followed EM indexes and this induces managers to "hug" their benchmark closely. Therefore, the tendency is for several of these active BDI funds to closely follow their benchmark as is evident in the decrease in the "active share" of a fund,[4] from our estimate of greater than 30 percent in 2010 to the 17 percent estimated by Miyajima and Shim for 2014. Our anal-

[2]At the other end of the spectrum are unconstrained multi-sector bond funds who freely choose portfolio allocations unshackled off benchmark indices. The end-investors in benchmark-driven funds and unconstrained funds such as open-end multi-sector bond funds can be retail or institutional.

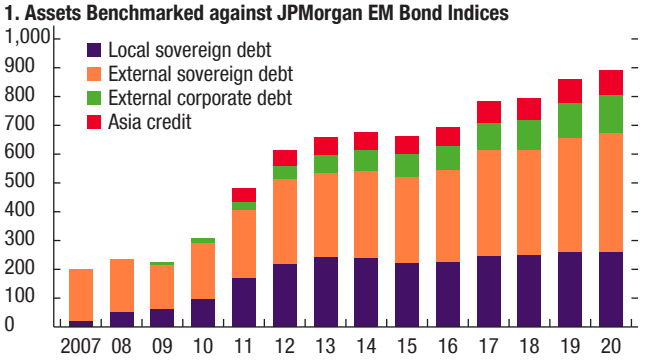
[3]Almost 30 percent of EM funds benchmarked invest in local sovereign debt, 45 percent invest in EM offshore sovereign debt and about 15 percent in EM offshore corporate debt.

[4]The active share of a fund is defined as the sum of the absolute value of deviations of the fund's country weights from those of the benchmark (Cremers and Petajisto 2009).

**Figure 9. Benchmark-Driven Investors are Becoming Large and Important**

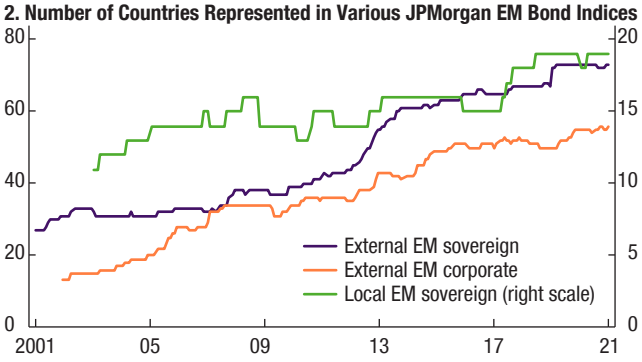
*A rising amount of assets involves tracking EM-dedicated fixed-income benchmarks.*

**1. Assets Benchmarked against JPMorgan EM Bond Indices**



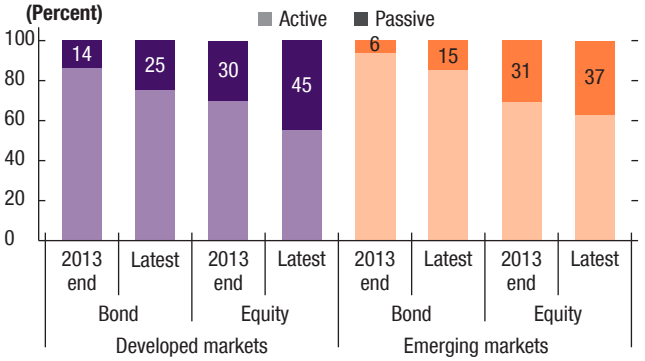

*... with a steady rise in the number of countries getting included in these benchmarks.*

**2. Number of Countries Represented in Various JPMorgan EM Bond Indices**



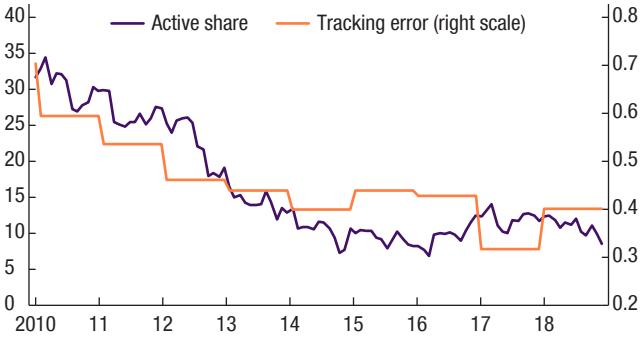

*The proportion of passive investors in emerging markets has increased, but still lags developed markets ...*

**3. Proportion of Fund Assets under Management Benchmarked to Active vs. Passive Funds (Percent)**




*... however, even the "active" funds are behaving increasingly as benchmark huggers.*

**4. Active Share and Tracking Error of EM Local Currency Bond Funds**




Sources: Arslanalp and others (2020); Bloomberg Finance L.P.; country sources, EPFR; Haver Analytics; JPMorgan Chase & Co.; IMF (2019); and IMF staff calculations.

Note: Details for panel 4 are available in IMF (2019) and Arslanalp and others (2020). The active share of a fund is defined as the sum of the absolute value of deviations of the fund's country weights from those of the benchmark (Cremers and Petajisto 2009). For this analysis, we use the EPFR Global database of funds to calculate the average country level allocations of all bond funds benchmarked to JPMorgan Government Bond Index-Emerging Markets. The difference between this country-level allocation and the benchmark weights are a measure of how closely EM local currency bond funds follow their benchmark index.

ysis shows that the active share has fluctuated around the lower 2014 estimate through 2019 (Figure 9, panel 4; IMF 2019).[5] This implies that the share of cross-border OEF flows that de facto correspond to passive indexation strategies is significantly higher than that managed by passive index OEFs.

[5]This finding is corroborated using other metrics, such as the average tracking error—the difference between the return of a fund and its benchmark—of EM local bond funds.

## Benchmark Driven Investors Have Significant Financial Stability Implications for Recipient Countries

While active investments can prove volatile in sell-off episodes, benchmark inclusion and exclusion decisions also matter significantly to financial stability. Benchmarks have significant effects on international investments and affect capital flows through both direct and indirect channels (Raddatz and others 2017). Benchmarks explain, on average, about 70 percent of country allocations even after controlling for macroeconomic, industry, and country-specific effects. Depending on whether a country is added to or removed from a benchmark can significantly impact the cost and supply of financing for real activity and domestic financial market volatility. A notable recent example is the inclusion of China's equities and bonds in global benchmarks. Estimates suggest that these inclusions could boost flows to China by $300–450 billion (Chen and others 2019).

BDI strategies induce greater correlation in portfolio flows within the cross-section of EM recipients and across EM bond yields. Analysis shows flows driven by EM benchmarks to be about three-to-five times more sensitive to common global risk factors than the balance of payments measures of portfolio flows (Figure 10, panel 1; IMF 2019; Arsnalap and others 2020). Importantly, this sensitivity has been rising over time (Figure 10, panel 2), reflecting the fact that BDIs tend to treat EMs as an asset class focusing on factors that affect them as a group rather than on country-specific developments.[6]

Cross-border spillovers are also affecting frontier markets. Frontier debt issuers have benefited from index inclusion and have become an important part of the EM debt asset class. Their share of international debt outstanding increased dramatically over the past decade; they now account for almost 20 percent of the widely used the EMBIG-Diversified index, making them a large beneficiary of benchmark-driven flows (Figure 11, panel 1). Foreign participation in the local bond markets is also broadly comparable across frontier and emerging markets (Figure 11, panel 3). High foreign investor participation can induce significant volatility in frontier markets because they often lack financial depth and have a relatively shallow domestic investor base.[7] Moreover, potential for contagion is now higher: given their sizable

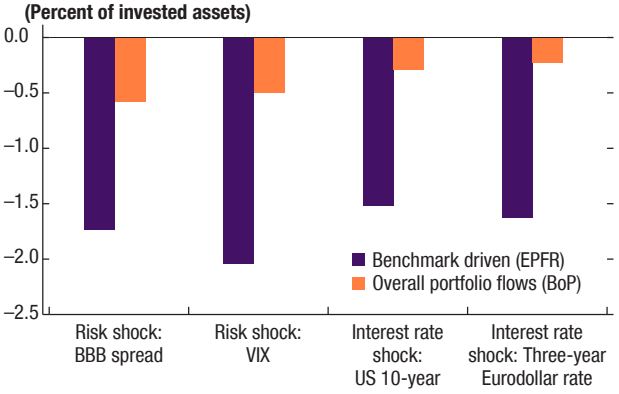
[6]Miyajima and Shim (2014) show that asset managers investing in EMs tend to behave in a correlated manner. Some of this behavior is because of common or similar portfolio benchmarks and the directional co-movement of end-investor flows.

[7]Latest data highlights that median frontier financial market depth is at 0.08 which compares with 0.33 for emerging financial market depth and 0.63 for advanced financial market depth (Figure 8, panel 4). While domestic financial deepening helps reduce yield volatility, greater foreign participation in local currency bond markets increases it beyond certain thresholds (IMF 2020).

**Figure 10. Benchmark-Driven Investors are Important for Financial Stability Issues**

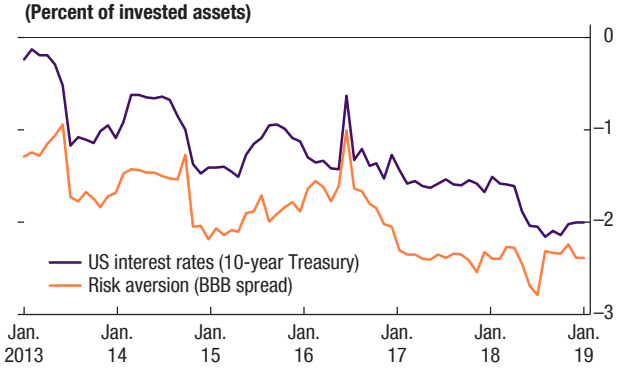
*BDIs are significantly more sensitive to external shocks ...*

**1. Sensitivity of Debt Flows to External Shocks**
**(Percent of invested assets)**



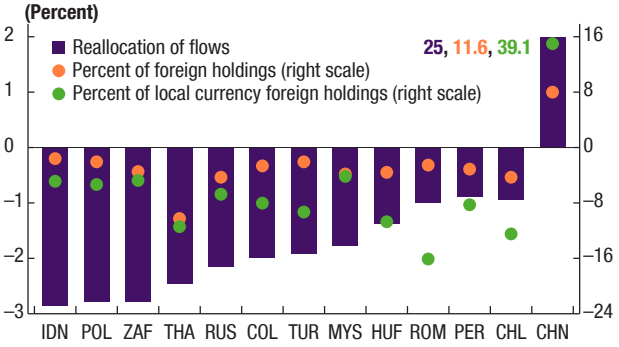

*... with a steady increase in this sensitivity over time.*

**2. Sensitivity of BDI Flows to External Shocks**
**(Percent of invested assets)**



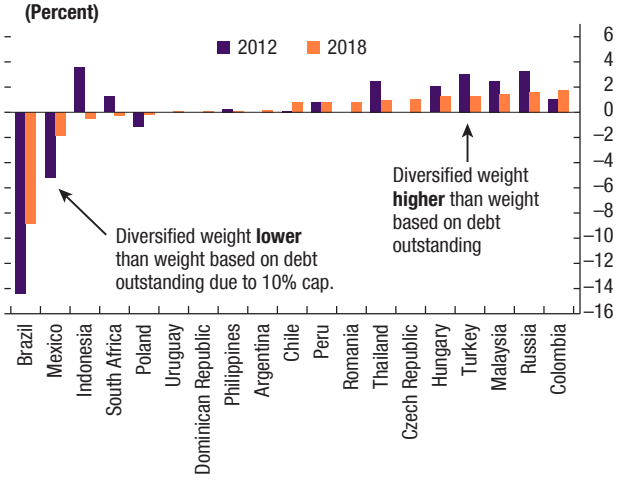

*China's inclusion in GBI-EM index led to reallocation.*

**3. Estimated Benchmark-Driven Reallocations due to China's Inclusion in JPMorgan GBI-EM Global Diversified Index**
**(Percent)**




*Some EM issuers benefit significantly from index rules.*

**4. Difference in Index Weight (using JPMorgan GBI-EM Diversified Index) and the Debt Outstanding Weights**
**(Percent)**




Sources: Arslanalp and others (2020); Bloomberg Finance L.P.; EPFR; Haver Analytics; IIF; JPMorgan Chase & Co.; IMF (2019); and IMF staff calculations. Details on the calculation for Figures 1–3 are also available in IMF (2019) and Arslanalp and others (2020).
Note: In panel 3, the actual flow can differ since investors may decide to deviate from benchmark weights and either over- or under-weight a given country. In this panel, the numbers "25, 11.6, and 39.1" correspond to the values for China (not shown in the chart due to the truncated *y* axis). BDI = benchmark driven investors.

contribution to the overall performance of EM external sovereign debt, episodes of distress in frontier markets could lead to redemptions from BDI funds, resulting in outflows even from countries with strong fundamentals.[8]

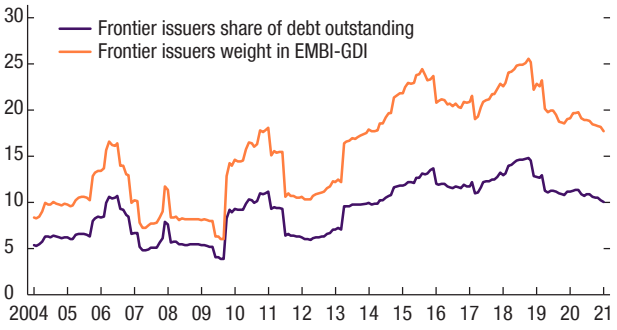
Mechanical aspects can also give rise to amplification effects. An important feature of the most popular EM benchmarks is a weighting method that

[8]In terms of the relative importance, Egypt, Nigeria and Ghana have the highest weights at 2.6, 1.5, and 1.5 percent of EMBIG Global Diversified respectively (Figure 11, panel 2).

**Figure 11. Frontier Markets and Cross-Border Spillovers**

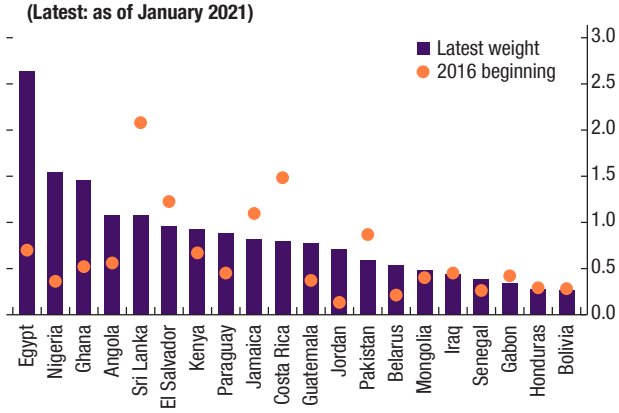
*Over the past decade, outstanding frontier debt has increased substantially, with more than 20 debut issuers.*

**1. Weight of Frontiers in EMBI-GDI Indices**



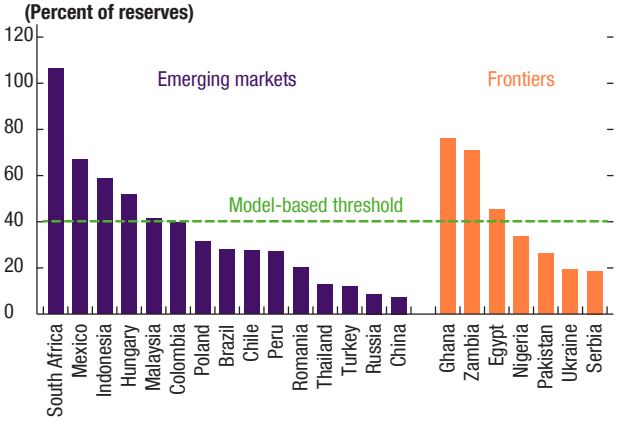

*Egypt, Nigeria, and Ghana have the highest weights in the EMBI-GDI.*

**2. Weight of Key Frontier Economies in EMBI-GDI (Latest: as of January 2021)**



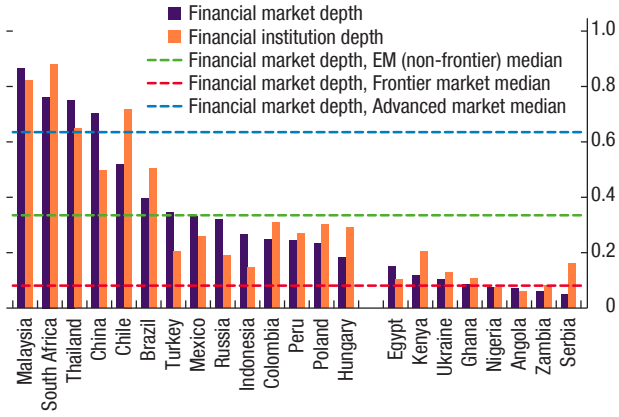

*Foreign participation in local currency bond markets is comparable between emerging and frontier market economies.*

**3. Foreign Holdings of Local Debt, Based on IMF (2020) (Percent of reserves)**




*Frontier markets have a significantly shallower investor base and market depth compared to emerging and advanced economies ...*

**4. Financial Market and Institutions Depth Score**




Sources: Bloomberg Finance, L.P.; JPMorgan Chase & Co.; IMF, *World Economic Outlook*; and IMF staff calculations.
Note: Panel 3 is based on the analysis done in IMF (2020) and on pre-COVID shock. The model-based threshold represents the threshold of holdings after which greater foreign participation in local currency bond markets increases the volatility of yields. Panel 4 is based on the latest available data. EMBI-GDI = JPMorgan Emerging Markets Bond Index-Global Diversified Index.

reduces the weight of larger issuers and redistributes the excess to smaller countries. For local currency government bonds, these benchmarks limit the maximum weight to 10 percent, which leads to more concentrated positions of BDIs in some smaller issuers. For example, Brazil's weight is capped 8 percentage points lower than it would be under the market capitalization weights used in global benchmarks (Figure 10, panel 4; Arslanalp and others 2020); smaller issuers such as Colombia, Hungary and Peru experience an increase in their weights by 1 to 2 percent. As the index is tracked by an

estimated $300 billion, a 2 percentage points higher weight would mean $6 billion additional BDI due to index rules, which can be very substantial for smaller countries.[9] Index reclassifications also have an important impact beyond the countries and asset-classes being specifically targeted. For instance, *based on benchmark weights*, several EMEs may be estimated to have potentially experienced a drop in fund allocations (USD $1—$3 bn), due to China's inclusion in the GBI-EM index because of the mechanical rebalancing of the index weights (Figure 10, panel 3; IMF 2019).[10]

## Unconstrained Bond Funds Can Also Be a Source of Outflows from EMDEs

Notwithstanding their smaller EM presence compared to BDIs, unconstrained multi sector bond funds (MSBFs) can potentially exert a large impact on cross-border flows.[11] As MSBFs are unconstrained by benchmarks, they can hold positions with high concentration risk and actively use derivatives and leverage. MSBFs have accounted for greater than 20 percent of the foreign investor base in the sovereign bonds of some jurisdictions (Figure 12).[12] More than two-thirds of MSBF investments in EMDEs belongs to funds that use leveraged investment strategies by making use of derivatives for both hedging and to boost returns. Unlike dedicated bond funds, where the decision to invest in EMs 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. As a result, MSBF portfolios typically deviate significantly from benchmarks (Cortes and Sanfilippo 2020). MSBFs are found to have a median

[9]Assigning index components in a direct proportion to the market cap can also induce financial stability issues and doesn't address all these concerns. It may induce market discipline distortions raising issuer incentives to increase leverage and also expose the benchmark driven investors to more vulnerable and highly indebted issuers.

[10]The spillovers work in the other direction as well as highlighted in the study by Raddatz and others (2017). In June 2013, Qatar and the United Arab Emirates were upgraded from the MSCI Frontier Markets Index to the MSCI EM Index. Since these countries accounted for about 40 percent of the MSCI FM Index, the funds tracking benchmarked had to significantly increase their loading in the other frontier countries sharing the index, resulting in significant inflows and stock market price increases in countries such as Kuwait, Nigeria, and Pakistan.

[11]Of total assets under management of $1 trillion, the 40 largest MSBFs' EM investments ranged from $100–$160 billion in recent years. The bulk of their EM investments are in sovereign bonds and bonds of state-owned enterprises. As of Q2:2020, these EM investments amounted to $85 billion and $15 billion, respectively.

[12]During the last decade, these 40 MSBFs accounted at times for greater than 20 percent of the foreign investor base of sovereign bond markets in Hungary, Malaysia, Ukraine, and Uruguay. More recently, they exceeded 10 percent of the foreign investor base in Brazil, India, and Mexico. MSBFs reached historical lows in their investment concentration in many EMs following the COVID-19 crisis (as of Q2:2020) as they rebalanced their portfolios into safer assets and sold positions in response to redemptions.

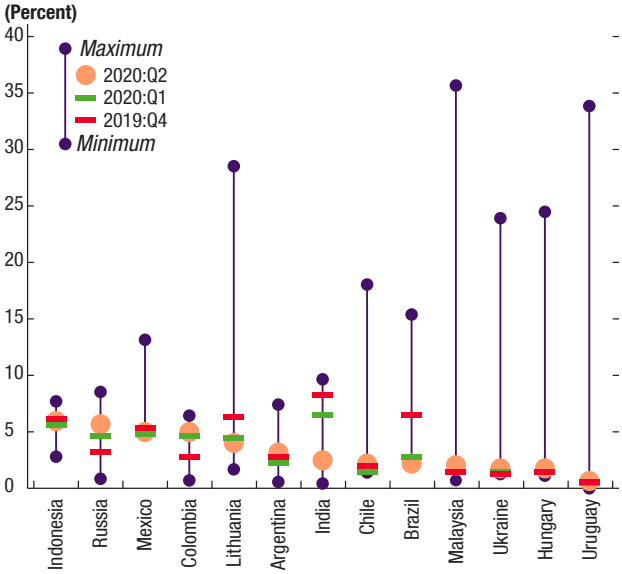
*active share* that has exceeded 70 percent.

In periods of high-risk aversion, large and concentrated MSBF portfolio reallocations out of EMs can be associated with underperformance of the same markets. This association is particularly strong in local currency bond markets where MSBFs typically have their largest exposures (Cortes and Sanfilippo 2020), which are countries where returns are potentially higher but also riskier. During the COVID-19 outbreak, outflows from MSBFs were responsible for an estimated pullback 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 very few jurisdictions that happened to be amongst the largest and more liquid EM sovereign issuers, while MSBFs kept their most illiquid exposures. Figures 13 and 14 show how, for the Latin America 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 EMEs, such as Argentina, remained unchanged, potentially increasing liquidity mismatches in their EM portfolios.

**Figure 12. MSBFs: Concentrated EM Exposures**

*MSBFs built up large exposures in the sovereign bonds of various key EMs but recently shed exposure close to historic lows, which have accelerated since the COVID-19 outbreak.*

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



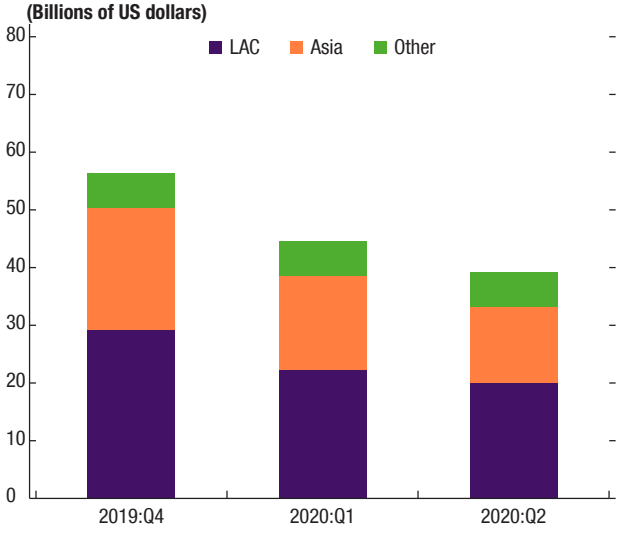

Sources: Arslanalp and Tsuda (2014 paper, 2020 data set update); Bloomberg Finance L.P.; and authors' calculations.
Note: Minimum, maximum, 2018:Q2, and 2020:Q2 reflect multi-sector bond funds (MSBF) holdings (excluding equities and state-owned enterprise holdings) as a share of the total foreign holdings of government debt in the respective country across the period 2009:Q4–2020:Q2.

## Policies to Support Stability of OEF Cross-Border Funding

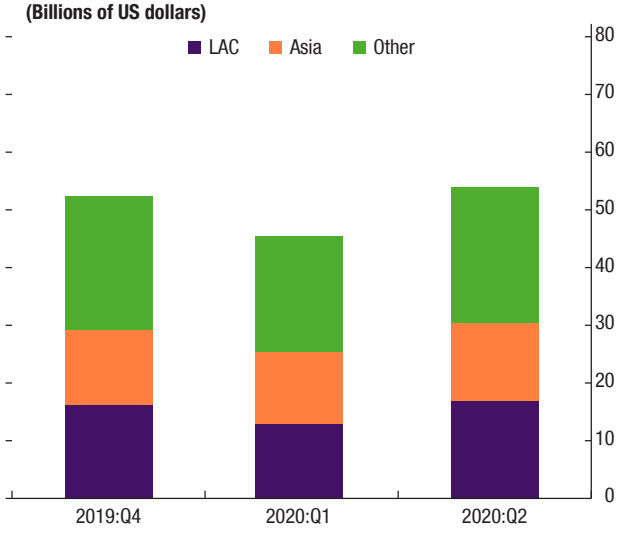
The policy approach to cross-border flows into EMs intermediated by OEFs and ETFs must be cognizant of benefits and costs. From the perspective of the source countries, international capital flows help increase the return on

**Figure 13. Emerging Market Flows from MSBFs through 2020:H1**

*During the COVID-19 outbreak, MSBFs cut most of their EM investment in local currency bond markets ...*




*... while hard currency holdings also experienced a (small) dip, it was followed by a quick recovery.*




Sources: Bloomberg Finance L.P.; and authors' calculations.
Note: Multi-sector bond funds (MSBFs).

savings and achieve diversification (Kose and others 2009). For recipient countries, an increase in capital flows can support productive investments and stimulate EMs' growth. At the same time capital flows carry risks as rapid capital inflows or disruptive outflows can create policy challenges, such as delayed fiscal reforms and excessive leverage (Jeanne and Rancière 2008).

Appropriate responses require a combination of both recipient and source country policies. Recipient countries need to be mindful of volatility and sudden stops in capital flows. Policy levers available to recipient countries will include efforts to foster domestic market development and the appropriate use of debt management tools. The recently developed Integrated Policy Framework (IMF 2020d, 2020e) also gives guidance to recipient countries on the mix of tools, including intervention in the currency market, macroprudential and capital flow management. Source countries also have an important role through regulation and supervision of investment funds that helps in mitigating cross-border spillovers.

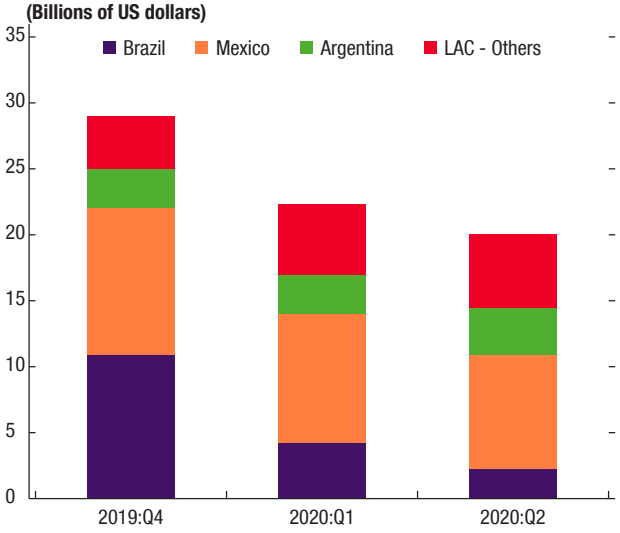
## Recipient Country Policies and Reforms

The development of local markets in recipient countries can help increase resilience. Greater depth of domestic financial markets and a stronger local

**Figure 14. MSBF Flows to Select Latin American Economies through H1:2020**

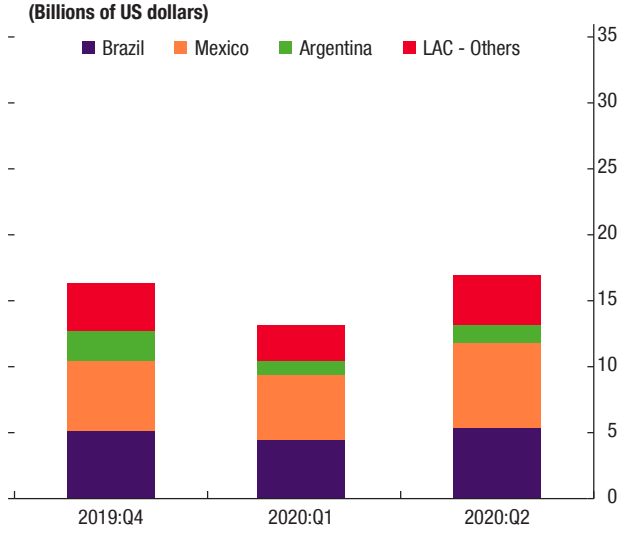
*Brazilian local currency bonds bore the brunt of the reduction in Latin America ...*

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




*... while hard currency bond exposures were stable.*

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




Sources: Bloomberg Finance L.P.; and authors' calculations.
Note: Multi-sector bond funds (MSBFs).

investor base are found to reduce the volatility of local currency bond prices and reduces the probability of significant bond outflows (October 2017 GFSR, Chapter 3, October 2018 GFSR, Chapter 2). Market development can improve the ability of domestic long-term institutional investors, such as insurance and pension funds, to absorb sudden changes in capital flows (April 2020 GFSR, Chapter 3; IMF 2021). Debt management policies aimed at achieving a diversified investor base will help reduce risk related to country-specific shocks. (IMF 2014, April 2020 GFSR, Chapter 2).

Recipient countries can deploy policy tools to help manage risks. Where capital flow management measures (CFMs) are deployed for financial stability reasons, and well targeted to mitigate financial risks, such "CFM/MPMs" (CFM/Macroprudential measures) can help achieve stability of funding for the corporate sector. However, such policies are costly and should not be considered as a substitute for necessary macroeconomic adjustment.[13] In face of large capital outflows, relaxation of MPMs tools can also reduce impact of shocks on market conditions, while foreign exchange intervention can mute excessive foreign exchange volatility in countries with adequate reserves.

[13]A good example is Indonesia's corporate prudential foreign exchange regulation which requires a minimum rating and hedging of short-term external debt to help moderate risks from corporate external debt.

The sequencing of reforms for EMs and low-income countries (LICs) is crucial. Specific measures include (1) developing efficient money markets, (2) strengthening primary market practices to enhance transparency and predictability of issuance, (3) developing a robust market infrastructure, (4) bolstering market liquidity, and (5) establishing a sound legal and regulatory framework for securities (IMF 2020).[14] Overall, given increased sensitivity of benchmark-driven investments to external factors, countries should also reduce external vulnerabilities and strengthen buffers by reducing excessive external liabilities and reliance on short-term debt, while maintaining adequate fiscal buffers and foreign exchange reserves.[15]

### Source Country Policies to Address Systemic Risks

Policies that mitigate redemption risks in the investment funds of source countries are also beneficial to recipient countries, but to be most effective they should be deployed globally. As discussed in the previous chapters, aligning redemption terms to the liquidity of assets is important to manage risks in the event of fund outflows. First, these policies can help address contagion, where the financial stress in the (larger) countries in the index could cause investors to pull the funds from the benchmark at short notice (Broner, Gelos, and Reinhart 2006). Second, they are important to ensure the continued stability of cross-border flows from advanced economies to EMEs and LICs. Global implementation of such policies would reduce the risk of a race-to-the-bottom, where a policy tightening in one country leads to shifts of funding elsewhere.[16]

MSBFs need improved regulation on concentration risks and disclosure standards. Currently, neither the Undertakings for Collective Investments in Transferable Securities (UCITS) Directives, nor the 1940 Investment Company Act, have any specific constraints on the amount of a particular bond issue that a single fund family can hold.[17] Regulators could set limits

[14]Transparent and efficient accounting standards and legal frameworks have been shown to help reduce the adverse effects from global financial shocks (Brandão-Marques and others 2018; Gelos and Wei 2003).

[15]A premature or partial inclusion of debt instruments in international bond indices can introduce bond-market fragmentation or concentration risks, respectively.

[16]Ireland, Luxembourg, the United Kingdom, and the United States are examples of countries wherein EME funds are domiciled and that have already made available policy tools to manage internal fund liquidity (IOSCO 2018).

[17]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. In the United States, 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

on a fund family's investment in a country's total debt, by setting a cap on the primary and secondary exposure. Such a measure would require global regulatory coordination, especially as it would be difficult from an EM issuer's perspective to implement this independently. Disclosure requirements on MSBFs' use of leverage and derivatives needs to be enhanced (as discussed in Chapter 4).

With the importance of benchmark-driven portfolio flows increasing, a close dialogue is needed between index providers, the investment community, and regulators. Enhanced transparency by index providers, such as on eligibility criteria for index inclusion and advance communication of forthcoming index changes, can help promote greater consistency and less flow volatility.

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.

# Conclusions

The oversight of the investment funds sector must continue moving beyond conduct and investor protection to placing greater emphasis on financial stability risks. This paper identified measures with design features that make them particularly attractive to meet key policy objectives. First, those that can attenuate first-exit incentives for (institutional) investors, such as decoupling liquidity gates from regulatory thresholds, removing CNAV (MMFs) and swing pricing (OEFs). Second, those that provide fund managers with a waterfall of LMTs that enlarge liquidity buffers and make them more usable, such as higher and countercyclical liquidity requirements and MBR for MMFs, liquidity matching and asset eligibility requirements for OEFs, and redemption-in-kind and gates for both.

Combined with other supporting policies that enhance resilience of investment funds and of market liquidity to adverse shocks, these measures would put nonbank intermediation of core markets and capital flows on a stabler footing. Liquidity backstops in the form of ex-ante commitments from dealers and alternative trading arrangements are potentially promising options for assets such as commercial paper. Flexibility of investment mandates and a through-the-cycle approach to cash equivalent accounting treatments could facilitate making investment positions of some institutional investors less flight prone. All of these would together serve to push the need for central bank emergency liquidity support to markets firmly into the tails of the shock distribution. In addition to policies supporting system wide liquidity, other measures that are important include increasing the range and granularity of disclosures regarding leverage and ensuring that supervisory resources and skills keep pace with expanded and more demanding mandates and tasks.

The growth of BDI flows has an increasingly prominent place in financial stability considerations for EMDEs. The significant benefits brought about by these flows should be conserved while guarding against any risk of such

a mode of capital flow intermediation becoming a cross-border transmitter of stress and market volatility that can exacerbate pre-existing vulnerabilities in recipient countries. The larger BDI inflows into EMs have posed increasing financial stability risks given greater sensitivity of the portfolio flows to changes in global financial factors and higher volatility in the pattern of flows.

Appropriate responses will require a combination of recipient and source country policies. Recipient countries need to be mindful of volatility and ebbs in capital flows and place emphasis on continued deepening of domestic markets, appropriate use of debt management tools, and the use of macroeconomic, prudential, capital flow management, and foreign exchange intervention tools. Policies that mitigate redemption risks in the investment funds of source countries are also beneficial to recipient countries, but to be most effective they should be deployed globally. Increasing transparency and disclosures by funds and index providers is an important additional measure.

The paper's analysis underscores the importance of the ongoing Financial Stability Board (FSB)-led process of identifying policy options involving national authorities and the International Organization of Securities Commissions (IOSCO) and other standard setters. In this context, the global nature of the investment fund business and fungibility of financial flows makes it vital to ensure consistency of global policy choices that can secure financial stability by precluding regulatory arbitrage.

# Annex 1. Actions of Select Central Banks to Support Markets during March 2020 Turmoil

**Annex Table 1.1. Selected Central Bank Facilities to Support Funding Markets**

| | Money Markets and Government Securities | Corporate Bond Market | Other Markets |
|---|---|---|---|
| **Bank of Canada** | **Government of Canada Bond Purchase Program**<br>Purchases of Government of Canada bonds in the secondary market to support market functioning and provide monetary stimulus.<br>**Bankers' Acceptance Purchase Facility**<br>Purchases of eligible bankers' acceptances to maintain credit to small- and medium-sized businesses.<br>**Provincial Money Market Purchase Program**<br>Purchases of provincial money market securities in the primary market.<br>**Provincial Bond Purchase Program**<br>Purchases of provincial bonds in the secondary market to support the liquidity and efficiency of these markets.<br>**Commercial Paper Purchase Program**<br>Purchases of eligible commercial paper in the primary and secondary markets to maintain the smooth flow of credit to corporations. | **Corporate Bond Purchase Program**<br>Purchases of corporate bonds in the secondary market to support liquidity and market functioning. | **Canada Mortgage Bond Purchase Program**<br>Purchases of CMBs in the secondary market to support market functioning and the ability of financial institutions to finance mortgage lending to Canadian homeowners. |
| **Bank of England** | **Asset Purchase Facility**<br>A £200 billion increase in the central bank's holdings of UK government bonds and sterling nonfinancial investment-grade corporate bonds to a total of £645 billion.<br>**COVID Corporate Financing Facility**<br>For 12 months the central bank and Treasury will purchase commercial paper of maturities up to one year issued by companies making a material contribution to the UK economy. | | |
| **Bank of Japan** | **Measures to Facilitate Corporate Financing**<br>Increased the upper limit of holdings of corporate bonds and commercial paper and introduced special funds-supplying operations to facilitate corporate financing.<br>**Active purchase of Japanese Government Bonds (JGBs)**<br>Conducted additional outright purchases of JGBs.<br>**Additional measures to maintain stability of the repo market**<br>Relaxed the conditions of its Securities Lending Facility (SLF). Conducted sales of Japanese Government Securities (JGS) with repurchase agreements intended to provide the market with JGS. | | **Purchase of Exchange Traded Funds and Real Estate Investment Trusts**<br>A doubling in the pace of exchange-traded fund purchases. |
| **European Central Bank** | **Pandemic Emergency Purchase Programme**<br>Purchases of private and public sector securities, until the end of 2020, up to a total amount of €750 billion. | | |
| **US Federal Reserve** | **Primary Dealer Credit Facility**<br>Provide credit to primary dealers in exchange for a broad range of collateral for term funding with maturities up to 90 days.<br>**Commercial Paper Funding Facility**<br>Purchases from eligible issuers, via a Special Purpose Vehicle (SPV), of three-month US dollar-denominated commercial paper.<br>**Money Market Mutual Fund Facility**<br>Provision of liquidity to eligible money market mutual funds. | **Primary Market Corporate Credit Facility**<br>Purchase bonds from eligible issuers, via a SPV, and make loans to eligible borrowers.<br>**Secondary Market Corporate Credit Facility**<br>Purchases of investment grade corporate bonds in the secondary market from eligible issuers. | **Term Asset-Backed Securities Loan Facility**<br>Loans to holders of certain AAA-rated asset-backed securities based on newly and recently originated consumer and small business loans. |

Sources: National central banks. See hyperlinks for more details

# Annex 2. MMF Reforms after the GFC

## United States

The SEC adopted a first series of amendments to its rules on MMFs in 2010 that were designed to make these funds more resilient by reducing the interest rate, credit, and liquidity risks of their portfolios. Although the reforms improved MMF resilience, the SEC said at the time that it would continue to consider whether further, more fundamental changes to MMF regulation might be warranted. After further review, in July 2014 the SEC adopted more fundamental structural changes to the regulations of MMFs. These reforms required non-government institutional MMFs to "float their NAV" (no longer maintain a stable price) and provided non-government MMF boards with new tools—liquidity fees and redemption gates—to address runs. Although these measures were adopted before the last US FSAP, they did not take effect until October 2016. MMFs that qualify as "government MMFs" and "retail MMFs" are still permitted to use the amortized cost method and/or penny rounding method of pricing to seek to maintain a stable share price. A government MMF is defined as any MMF that invests 99.5 percent or more of its total assets in cash, government securities, and/or repurchase agreements that are collateralized fully by government securities or cash and meet certain other regulatory requirements with respect to value and custody. A retail MMF is defined as a MMF that has policies and procedures reasonably designed to limit all beneficial owners of the MMF to natural persons. The broad reasoning behind this approach is that, for government MMFs, the safety of the eligible portfolio securities is such that a stable NAV is justified, while for retail MMFs the more patient holding strategy of the investors (who, according to historical holding patterns, are less likely to "run" during periods of stress) means that a stable NAV continues to be appropriate.

## European Union (EU)

In the EU, the MMF Regulation (MMFR) took effect in July 2018. The new framework distinguished between three types of MMF: VNAV MMFs; public debt constant net asset value MMFs (public debt CNAV); and low volatility net asset value MMFs (LVNAV MMFs). VNAV can either be set up as short-term MMF or standard MMF which are subject to different portfolio rules, whereas public debt CNAV MMF and LVNAV MMF may only be set up as short-term MMF. The MMFR applies alongside the two cornerstones of EU investment fund regulation, the UCITS Directive and the Alternative Investment Fund Managers Directive.

## Asia

Originally all MMFs in China were CNAV MMFs. A set of reforms that began in 2014 limited the types of asset in which MMFs can invest, strengthened requirements around liquidity risk management and sought to improve disclosures. The reforms also led eventually to the establishment of a pilot VNAV MMF in August 2019. In Japan, there were historically two categories of MMF vehicle: the Money Management Fund (JMMF) launched in 1992, and the Money Reserve Fund (MRF) launched in 1997. JMMFs and MRFs take the form of investment trusts which invest primarily in MMIs as well as government and corporate bonds with limited maturities according to the relevant legal provisions. In terms of AuM, JMMFs historically represented approximately one third of the combined MRF and JMMF TNA in 2010. JMMF have nevertheless progressively reduced in size and market share. Since May 2017, there are no longer any JMMFs in Japan. MRFs are used by broker-dealers in Japan for the purpose of settlement and pooling of cash, given the prohibition on broker-dealers accepting deposits. Given this specific purpose, MRFs are CNAV MMFs.

# Annex 3. Detailed Presentation of MMF Policy Options

**Annex 3. Detailed Presentation of MMF Policy Options**

| Policy Option | Key Features | Pros | Cons |
|---|---|---|---|
| Decouple liquidity thresholds from fees and gates | This option allows funds to impose fees or gates when doing so is in the best interests of the fund. | Decreases incentives for redemptions and reduces the likelihood of gates | In absence of formal threshold, investors may apply their own threshold |
| Reform of conditions for imposing redemption fees/gates | Funds required to obtain permission from regulatory authorities prior to imposing fees/gates | Supervisor able to intervene to secure best interests of investors | May lead to undue delays in application of fees/gates<br>Supervisors may not have sufficient data to allow informed decision on permitting/denying imposition of fees/gates |
| Minimum balance at risk (MBR) | A portion of each shareholder's recent balances in a MMF is available for redemption only with a time delay to ensure that redeeming investors remain partially invested in the fund over a certain time period | Decrease incentives for redemptions and potential for fire sales<br>Reduces likelihood of suspensions<br>Changes investor perception of MMF as cash-like<br>MBR could be higher for institutional investors | Swing pricing and/or capital buffers may have similar beneficial effects with less complexity. |
| Liquidity buffer | New, stricter requirements on liquid assets imposed (higher thresholds and/or shorter durations for less liquid assets) | More stringent requirements on WLA would increase availability of liquidity during periods of market stress | More liquid assets is good per se from regulatory (c.f. commercial) perspective but may not suffice in period of extreme stress |
| Countercyclical liquidity buffer | Liquidity buffer rises or falls automatically in certain circumstances, such as when net redemptions are large | Addresses problems associated with minimum thresholds of WLA | Complex calibration required<br>Depending on precise approach adopted, subject to reliability of stress tests |
| Floating NAVs for all nongovernment MMFs | Nongovernment MMFs required to move to become VNAV MMFs; NAVs move in line with market prices | Removes first-mover advantage<br>Risks borne by investors clearer | Nongovernment MMFs would no longer be cash-equivalent |
| Swing pricing | MMF adjusts the dealing price for inflows or outflows to take into account the costs of purchasing or selling assets of the fund | Reduces redemption requests under stressed conditions<br>Reduces first mover advantage<br>Concrete evidence of positive effects on OEFs<br>Legal basis already exists in major jurisdictions (EU/US) | Choice between full and partial swing and calibration of swing can be complex<br>Not possible for CNAV<br>Successful implementation depends on availability of data on spread and cost information for MMIs (but introduction of swing pricing could encourage efforts to improve that data) |
| Macroprudential swing pricing | Regulators impose and calibrate swing pricing ex ante | Removes stigma effect for MMFs<br>Takes account of systemic risk<br>Less extreme than other LMTs, for example, suspensions | Calibration of tools requires significant data set on inflows/outflows and portfolio liquidity<br>Could act as disincentive to investors in MMFs generally<br>Full disclosure of trigger thresholds could strengthen run incentives |
| Capital buffer | Dedicated resources within or alongside fund to absorb losses | Allows losses to be absorbed without recourse to extraordinary CB intervention<br>Reduces incentives for redemption by limiting risks of large losses to shareholders and first-mover advantage | Not clear where resources for buffer would come from<br>Application to VNAV MMFs would require calibration (for example only when NAV drops by large amount) |

*(continued)*

| Policy Option | Key Features | Pros | Cons |
|---|---|---|---|
| Centralized external support (liquidity exchange bank) | Centralized and pre-funded facility for MMFs to transact with during a crisis | Gives greater confidence to market that all MMF types able to withstand crisis scenario<br>Could reduce first mover advantage | Would need to be applied across all major MMF jurisdictions to prevent arbitrage between covered and non-covered funds |
| Sponsor support | Prohibition of, or clarification of permissibility of, support from sponsor or related party | Outright prohibition would be neater solution<br>Allows greater predictability in crisis scenario | If sponsor support allowed, may unduly favor MMFs that belong to large banking groups |
| Adjust liquidity buffers according to the share of funds' institutional investors | Liquidity buffers adjusted according to funds' structural exposure to funding risk (institutional investors more likely to run) | Reduces first-mover advantage by recognizing greater propensity of institutional investors to run | Implementation more complex for funds with both retail and institutional investor base<br>Data on liability side may be insufficient<br>Burden on regulators to set increase/decrease of buffer |
| Greater transparency on MMIs | Improved data on issuance and outstanding amount of MMIs in primary and secondary markets | May increase market liquidity and facilitate price discovery | No cons as such (greater transparency is always +ve) |
| Enhance MMF reporting framework | More harmonized, detailed and frequent reporting from MMFs to authorities | Gives authorities—both central banks and securities regulators—better overview of industry | No cons as such (greater transparency is always +ve) but market participants often argue that regulators do not use reporting data sufficiently to justify the extra costs involved |
| Abolish nongovernment MMFs | MMFs limited to government MMFs only | Clean, neat solution—reduces credit and liquidity risks significantly | Short-term bond funds not plausible alternative due to lack of cash-equivalence |
| Liquidity-based redemptions deferrals | MMF portfolio holdings are classified according to their liquidity; redemption is aligned with the fund's liquidity profile | Reduces liquidity mismatch<br>Less risk of fire sales<br>Introduces clearer link between asset and liability side | May be some complexities in calibration |
| Limits on eligible assets for non-government MMFs | Stricter requirements on holdings of illiquid assets | Reduces liquidity mismatch | Issues around cash equivalence definition<br>Defining liquid vs. ineligible assets may be challenging |
| MMF investor concentration limits | Limits on percentage of MMF shares held by a given investor | Reduces likelihood of suspension triggered by small number of investors | Application depends on quality of data on liabilities |
| Improved disclosure on STFM investor base | Holdings of main categories of investor made available per type of issuer, currency, and maturity | Aids regulators' oversight of market | No cons per se; may be complex to implement |
| Stress testing by managers | More frequent and sophisticated stress tests undertaken according to parameters specified by authorities | Allows early identification of vulnerabilities<br>Useful information for supervisors<br>Strengthens IOSCO Recommendation 8 | Discretion on parameters left to MMF managers |
| Stress testing by authorities | Systemwide stress testing of entire MMF sector | Same as for previous option but allows for regulators to prescribe more rigorous approach<br>Gives genuine sector-wide picture | Dependent on access to/quality of data<br>Follow-up of stress tests results depends on regulatory approach |
| Removal of stable NAV | All MMFs required to have floating NAV | Removes threshold effects<br>Investors should become more aware of market risk | Removes important category of cash management vehicles |
| Prohibition on daily dealing for nongovernment MMFs | Only government MMFs allowed to offer daily redemptions | Addresses liquidity mismatch in prime MMFs<br>Removes link between MMF withdrawals and margin calls (but risk potentially displaced elsewhere for example if MMF investors chose to rely instead on lines of credit for immediate cash needs). | Reduced appetite for MMFs could lead to loss of funding source for MMI issuers |
| Redemptions in kind | Institutional investors receive share of portfolio securities instead of cash | Reduces first-mover advantage and incentives for large redemptions in times of stress | Cannot be used with retail investors<br>Some funds currently do not allow redemption in kind proportionate to investor holdings in fund |

# Annex 4. Recent Developments on International Standards for OEFs

International standards on financial stability issues relating to OEFs have been further developed in recent years. There has been significant work by the FSB and IOSCO devoted to developing policy on relevant OEF areas that has translated into enhanced standards on a number of areas.

The FSB issued policy recommendations to address structural vulnerabilities from asset management activities in 2017, focused on four areas: (i) liquidity mismatch between investments and redemption terms and conditions; (ii) leverage within funds; (iii) operational risk and challenges at asset managers in stressed conditions; and (iv) securities lending activities of asset managers and funds.

IOSCO issued two important documents in 2018 and 2019 covering LRM and leverage.

- Recommendations for LRM for Collective Investment Schemes (2018), build on the 2012 Principles, elaborating on issues like suitability of dealing frequency of funds' units to better align assets and liabilities; disclosure of funds' liquidity profiles; operability of liquidity management tools; and fund level stress testing. The document also includes new recommendations on contingency planning.
- Recommendations for a framework to assessing leverage in investment funds (2019) develop a two-step framework to facilitate more meaningful monitoring, using measures of leverage to first identify and analyze funds that may pose financial stability risks, followed by further analysis of such funds. IOSCO is expected to collect leverage data from its membership to implement step 1.

IOSCO's work on OEFs goes beyond what is summarized here.

While IOSCO's work on LRM and leverage offers significant guidance, its recommendations may not prove fully effective in addressing potential financial stability issues. Due to the complexity and diversity of the sector and numerous important differences in national legal frameworks, the recommendations necessarily remain high-level, leaving a number of key issues open to discretion. Moreover, a number of recommendations are applicable only to the extent that regulatory frameworks permit which also weakens their effectiveness.

Providing supplementary guidance to supervisors on specific areas relevant to financial stability would greatly improve international standards. While obtaining consensus on every regulatory and supervisory item around OEFs is overly complex and unnecessary, reaching agreement on the key areas that impact for how OEFs behave in relation to systemic risk will prove very beneficial. Some of these, where we believe more concrete guidance is necessary are flagged in Chapter 4 of this paper, including aligning liquidity and frequency of redemptions at the design phase, widening the availability of LRM tools and broader use of swing pricing.

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