FSB FINANCIAL STABILITY BOARD

Policy Proposals to Enhance Money Market Fund Resilience

Final report

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Executive summary

Actions by FSB members to address MMF vulnerabilities

The March 2020 market turmoil exposed vulnerabilities in MMFs that need to be addressed. As stated below, MMFs are subject to two broad types of vulnerabilities that can be mutually reinforcing: they are susceptible to sudden and disruptive redemptions, and they may face challenges in selling assets, particularly under stressed conditions. The prevalence of these vulnerabilities in individual jurisdictions may depend on market structures, use and characteristics of MMFs. In practice, these two types of vulnerabilities have been significantly more prominent in non-public debt MMFs.

FSB members are assessing, or will assess, MMF vulnerabilities in their jurisdiction and will address them using the framework and policy toolkit in this report, in line with their domestic legal frameworks. The FSB recognises that individual jurisdictions need flexibility to tailor measures to their specific circumstances. At the same time, as shown by the experience of March 2020, there are important cross-border considerations to be kept in mind. International coordination and cooperation on implementing policy reforms is critical to mitigate spillovers and avoid regulatory arbitrage. The policy toolkit includes mechanisms to impose on redeeming fund investors the cost of their redemptions; to absorb credit losses; to address regulatory thresholds that may give rise to cliff effects; and to reduce liquidity transformation (Table 3 in the report shows the specific policy options by the mechanism used to enhance resilience).

In addition, the FSB will, working with IOSCO, review progress made by member jurisdictions in adopting reforms to enhance MMF resilience. The review process involves a stocktake to be completed by the end of 2023 of the measures adopted by FSB member jurisdictions, including their evidence-based explanation of relevant MMF vulnerabilities and policy choices made. This stocktake will be followed up by 2026 with an assessment of the effectiveness of these measures in addressing risks to financial stability.

IOSCO plans to revisit its 2012 Policy Recommendations for Money Market Funds in light of the framework and policy toolkit in this report. Depending on the timing of IOSCO's review, this exercise may form part of the initial stocktake by the FSB and IOSCO.

Finally, in response to the feedback from the public consultation, the FSB and IOSCO intend to carry out follow-up work, complementing MMF policy reforms, to enhance the functioning and resilience of short-term funding markets.

Content of the report

This report sets out policy proposals to enhance money market fund (MMF) resilience, including with respect to the appropriate structure of the sector and of underlying short-term funding markets (STFMs). It reflects public feedback received on a consultative version of the report, which the FSB published in June 2021. The policy proposals form part of the FSB's work programme on non-bank financial intermediation and are intended to inform jurisdiction-specific reforms and any necessary adjustments to the policy recommendations for MMFs issued by IOSCO. Enhancing MMF resilience will help address systemic risks and minimise the need for future extraordinary central bank interventions to support the sector.

MMFs are open-ended investment funds that are managed with the aim of providing principal stability, daily liquidity, risk diversification and returns consistent with prevailing money market rates. MMFs are not homogeneous and their structure and risk characteristics differ across jurisdictions. MMFs are important providers of short-term financing for financial institutions (especially dollar funding for banks headquartered outside the US), corporations, and governments. They are also used by retail and institutional investors to invest excess cash and manage their short-term liquidity needs. While MMFs invest mostly in short-term debt instruments, their shares are redeemable on demand and many investors tend to treat MMFs as cash-like. Non-public debt MMFs are particularly active in the commercial paper (CP), negotiable certificates of deposit (CDs) and repo markets. Secondary markets for CP and CDs are generally not liquid as investors, including MMFs, tend to buy and hold these instruments to maturity.

MMFs are subject to two broad types of vulnerabilities that can be mutually reinforcing: they are susceptible to sudden and disruptive redemptions, and they may face challenges in selling assets, particularly under stressed conditions. The first type of vulnerability arises from the fact that MMFs engage in liquidity transformation, are used for cash management by investors, and are exposed to credit risk. In addition, regulatory thresholds for some MMFs may cause investors to pre-emptively redeem to avoid the consequences of a fund crossing those thresholds (cliff effects), while certain types of investors (notably institutional investors) may amplify redemption risks. Taken together, these features can contribute to a first-mover advantage for redeeming investors in a stress event and thus make individual MMFs, or even the entire MMF sector, susceptible to runs. The second type of vulnerability arises because some MMFs hold financial instruments that have limited liquidity, even under normal market conditions. In practice, these two types of vulnerabilities have been significantly more prominent in non-public debt MMFs.

Some features of MMFs and their uses may also give rise to system-wide vulnerabilities. For example, similarities in portfolios may present contagion risks among MMFs, as strains on one fund may affect others that hold similar assets. Common features in fund structure and regulation, such as thresholds, may cause investors to react to news about one fund by redeeming shares from other funds. The usage of MMFs for cash management and specialised financial functions, such as to meet margin calls, may add a common component to MMF flows that exacerbates stress. The susceptibility of non-public debt MMFs to sudden and disruptive redemptions in episodes of stress has been evident in a number of jurisdictions and triggered by different shocks, most notably in the US and Europe in September 2008 and March 2020.

The report considers the likely effects of a broad range of policy options to address MMF vulnerabilities, by examining how these options would affect the behaviour of MMF investors, fund managers and sponsors, as well as the options' broader effects on short-term funding markets, including through impacts on the use of potential substitutes for MMFs. Policy options are grouped according to the main – though not necessarily the only – mechanism through which they aim to enhance MMF resilience. Representative options under each mechanism include: swing pricing (to impose on redeeming investors the cost of their redemptions); minimum balance at risk and a capital buffer (to absorb losses); removal of ties between regulatory thresholds and imposition of fees/gates and removal of the stable net asset value (to reduce threshold effects); and limits on eligible assets and additional liquidity requirements and escalation procedures (to reduce liquidity transformation). Other options that can be considered as variants or extensions of the representative options are also presented in the report.

Two sets of considerations are relevant for jurisdictions when selecting MMF policy options. The first is about how to prioritise specific options in the context of identified vulnerabilities. Important factors to consider will be existing regulations, the size and structure of the MMF sector in the jurisdiction, and the use of MMFs by different types of investors and borrowers in STFMs. These factors will affect the need for certain options across jurisdictions and their effectiveness. Currency denomination is another important consideration in jurisdictions with MMFs offered in foreign currencies. The wider impact on the financial system will depend on how the reforms will affect the linkages between MMFs and other market participants, as well as on the types of MMF alternatives available to investors and borrowers in STFMs, including on a cross-border basis.

A single policy option on its own may not address all vulnerabilities. Accordingly, the second set of considerations is how authorities can combine options to address all MMF vulnerabilities prevalent in the jurisdiction. A natural starting point is to consider tools that authorities and MMFs have at their disposal, but have not used in practice. In terms of new policies, certain measures may be straightforward to implement and broadly compatible with all options, while others may be incompatible with each other. Another possible consideration may be the intended functions of MMFs – for example, some jurisdictions may consider the goal of enhancing resilience is to be achieved by making them more cash-like (i.e. aiming at preservation of capital and liquidity for investors) or more investment-like (i.e. allowing greater price variability or changes in redemption terms in stress), while some others may want to take actions to enhance resilience while preserving a balance between these two functions.

Irrespective of the direction of change, authorities need to ensure that the selected combination of options is coherent in its objectives and design. As with prioritising individual options, the optimal combination of measures should take account of jurisdiction-specific circumstances and policy priorities, as well as cross-border considerations including to prevent regulatory arbitrage that could arise from adopting divergent approaches across jurisdictions.

Policies aimed at enhancing the resilience of MMFs could be accompanied by additional reforms in two areas. The first involves policies such as stress testing and transparency requirements on STFMs and their participants. While not directly addressing MMF vulnerabilities, such policies can support robust risk management by fund managers and risk monitoring by authorities. The second area involves measures that aim at improving the functioning of the underlying STFMs. The structure of the CP and CD markets makes them susceptible to illiquidity in times of stress. This highlights the need for policy reforms to enhance MMFs' own resilience, as those funds cannot rely on liquidity in these markets to raise cash to meet redemptions in stress. At the same time, even in jurisdictions where MMFs are large investors in CP and CDs, MMF reforms by themselves will not likely solve the structural fragilities in STFMs. Authorities might therefore consider adopting measures to improve the functioning of CP and CD markets. While useful in their own right, it is not clear that such measures would change the limited incentives of market participants to trade or of dealers to intermediate, particularly during stress periods.

1. Introduction

The FSB's holistic review of the March 2020 market turmoil lays out a comprehensive and ambitious work programme for strengthening the resilience of non-bank financial intermediation (NBFI) while preserving its benefits.[1] A key deliverable of the work programme for 2021 is policy proposals to enhance the resilience of money market funds (MMFs).

MMFs are important providers of short-term financing for financial institutions, corporations, and governments. MMFs are also used by retail and institutional investors to invest excess cash and manage their liquidity. While MMFs invest mostly in short-term debt instruments, MMF shares are redeemable on demand and many investors tend to treat MMFs as cash-like.

The March 2020 market turmoil highlighted structural vulnerabilities in MMFs and related stress in STFMs, refocusing attention on longstanding questions about the structure of those funds.[2] Massive central bank interventions, including asset purchases in those markets and measures targeted specifically at MMFs in some jurisdictions, also assisted by regulatory relief measures, eased financial market strains but did not address the underlying vulnerabilities for MMFs.

Against this backdrop, the main objective of this report is to set out policy proposals to enhance MMF resilience. The report also sets out considerations on how policy options could be selected and combined to address all the vulnerabilities arising from different types of MMFs. Enhancing MMF resilience will thus help address systemic risks and minimise the need for future extraordinary central bank interventions to support the sector.

The policy proposals described in this report have been identified by FSB and IOSCO members. The proposals take account of the current role of MMFs as providers of short-term funding to the real economy and as a cash management tool for some investors. The proposals are intended to inform jurisdiction-specific reforms and any necessary adjustments to the policy recommendations for MMFs issued by IOSCO.[3]

The report was prepared by the FSB Technical Expert Group (TEG) on MMFs, which comprises experts from FSB and IOSCO member institutions, under the oversight of the FSB Steering Committee and its Group on Non-Bank Financial Intermediation. The TEG is co-chaired by representatives of the Bank for International Settlements and the US Securities and Exchange Commission, supported by a joint FSB and IOSCO Secretariat.

In preparing these policy proposals, the TEG analysed information from various sources, including reports from the FSB, IOSCO and other standard-setting bodies; data and analysis from working group members; other analysis from FSB member authorities, academics and the private sector; and input from external stakeholders.[4] The TEG was also supported by other FSB

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1 See the FSB's *Holistic Review of the March Market Turmoil* (November 2020).

2 See FSB (ibid) and IOSCO's Thematic Note on *Money Market Funds during the March-April Episode* (November 2020).

3 IOSCO issued 15 policy recommendations that provide the basis for common standards of regulation and management of MMFs across jurisdictions. See the IOSCO *Policy Recommendations for Money Market Funds* (October 2012).

4 This involved separate outreach sessions with a representative sample of MMF managers, investors in MMFs, borrowers from MMFs, and bank dealers active in STFMs where MMFs operate. Academics and other stakeholders (e.g. think tanks, former regulators, credit rating agencies) were also invited to each session to provide a diverse set of perspectives and a balanced representation, including on a geographical basis. The FSB also held a virtual workshop in July 2021 to gather feedback from stakeholders on its analysis of MMF vulnerabilities and on policy options to address them described in the consultation report.

groups in the development of analytical maps showing interconnections within the MMF ecosystem, and in analysing dealer behaviour and its drivers in STFMs.

This report is structured as follows:

- Section 2 outlines briefly the forms, functions and roles of MMFs to provide context on their importance, and describes potential substitutes for MMFs that may become more important if the role of MMFs changes.
- Section 3 identifies the vulnerabilities of MMFs to provide the basis for the subsequent discussion of policy options to enhance resilience, and describes how these vulnerabilities affect and interact with STFMs, including in the 2008 financial crisis and the March 2020 market turmoil.
- Section 4 describes a set of policy options to enhance resilience and the effects of those options on MMF investors, fund managers/sponsors, and broader markets (based on an assessment framework developed by the TEG).
- Section 5 mentions other potential measures that may be considered (in addition to MMF reforms) to enhance risk identification and monitoring by fund managers and authorities, and to improve the functioning of STFMs.
- Section 6 provides considerations in selecting MMF policy options – and combinations of options – with illustrative examples.

The report also includes annexes with additional information on MMFs and STFMs (Annex A); the assessment framework developed by the TEG to assess the effects of different policy options (Annex B); the assessments of the variants of policy options described in section 4 (Annex C); and a glossary (Annex D).

2. Forms, functions and roles of MMFs

This section describes the forms, functions and roles of MMFs, including in the context of broader STFMs, to provide a basis for the subsequent assessment of the effects of different policy options. The first sub-section below describes the different types of MMFs across jurisdictions and discusses the role of MMFs as part of a broader short-term funding ecosystem (a more in-depth description of MMFs and the underlying markets in which they invest can be found in Annex A). On this basis, the remaining sub-sections discuss the use of MMFs by investors and borrowers, and potential substitutes.

2.1. MMF types

Although there is no unique definition across jurisdictions, MMFs can be described as open-ended investment funds that are managed with the aim of providing principal stability, daily liquidity, risk diversification and returns consistent with prevailing money market rates. MMFs are not homogeneous and their structure and risk characteristics differ across jurisdictions (see below). They are interconnected with other parts of the financial system and with the real economy since they serve a broad range of investors (often for cash management purposes) and provide short-term financing to banks, other financial firms, non-financial firms, and governments. MMFs hold high credit-quality, short-term instruments, at least some portion of which are highly liquid. Hence, MMFs are important intermediaries in the STFMs between investors with cash to lend and borrowers with short-term funding needs.

The nature of principal stability that MMFs aim to provide varies by jurisdiction and currency. MMFs in some jurisdictions offer “stable” net asset values (NAVs); these funds usually sell and redeem shares at par based on valuing some or all assets at amortised cost rather than mark-to-market valuations. Stable NAVs are a feature of government and retail MMFs in the US, public debt constant NAV and low-volatility NAV (CNAV and LVNAV respectively) MMFs in the European Union (EU), and virtually all MMFs in China and Japan. Other MMFs have variable NAVs (VNAVs) that fluctuate with the market value of their portfolios, although changes in their NAVs are typically very small, consistent with the funds’ objective of maintaining principal stability. VNAV funds include prime institutional MMFs in the US and short-term and standard MMFs in the EU (see Box 1). As described in subsequent sections, the variations in the principal stability of MMFs may affect the appropriateness of some reform options and their impacts on MMF business models and vulnerabilities.

Box 1: MMF definitions and structures across jurisdictions

The definition and scope of MMFs can vary across jurisdictions. In most jurisdictions, funds investing in short-term money market instruments while offering daily redemptions are considered MMFs. However, some jurisdictions such as the EU have a broader scope of MMFs than others. For example, ultra-short-term bond funds are not considered MMFs in the US, while in the EU they are regulated as MMFs. Relatedly, private liquidity funds in the US follow usually similar investment mandates as MMFs but are not registered as such, while they tend to be considered MMFs in the EU.

MMFs in the US include: (1) government MMFs, which invest in the short-term debt obligations of the US government (including the US Treasury and federal agencies) and repos collateralised by government securities; (2) prime MMFs, which invest in the short-term obligations of both public and private issuers, including CP and negotiable CDs; and (3) tax-exempt MMFs, which hold short-term state and local government and municipal securities. Retail and institutional investors can invest in all types of MMFs, although some prime and tax-exempt MMFs are offered only to retail investors. The structure and regulatory requirements vary across these different types of MMFs. Government MMFs, as well as prime and tax-exempt MMFs offered to retail investors, maintain stable NAVs, but non-government MMFs used by institutional investors have variable NAVs. All funds are required to maintain weekly liquid assets (WLA) of at least 30% of total assets (government and prime funds also must maintain daily liquid assets of at least 10% of total assets). All prime and tax-exempt funds have provisions that allow the boards of these funds to impose liquidity (redemption) fees of up to 2% or to temporarily suspend redemptions if WLA falls below the 30% minimum required.

MMFs in the EU (and the UK at present) are structured on the basis of the EU Money Market Fund Regulation (MMFR) and fall under two broad categories based on the residual maturity of the assets they invest in. These are: (1) standard MMFs, which are VNAV funds and have a 6-month limit on the weighted average maturity (WAM) of their portfolio; and (2) short-term MMFs, which are subject to a 60-day limit on the WAM of their portfolio. Short-term MMFs can be CNAV for public debt MMFs, and either VNAV or “low volatility” NAV (LVNAV) for non-public debt MMFs. LVNAV funds offer a constant NAV to investors; however, if the mark-to-market NAV deviates by more than 20 basis points, the fund has to value its assets using variable pricing. Standard MMFs have minimum weekly liquidity ratio requirements of 15% and daily liquidity ratio requirements of 7.5%. They are not subject to requirements linking liquidity thresholds to the imposition of fees and gates. Short-term MMFs have differing weekly and daily liquidity ratio requirements depending on whether they are VNAV or not. CNAV and LVNAV MMFs have weekly liquidity ratios of 30% and daily liquidity ratios of 10%; other funds have weekly liquidity ratios of 15% and daily liquidity ratios of 7.5%. CNAV and LVNAV MMFs have provisions that allow the boards of these funds to impose liquidity (redemption) fees, partial gates or suspension of redemptions if WLA falls below 30% and daily outflows are above 10%. CNAV and LVNAV MMFs are subject to mandatory fees and gate if their weekly liquid assets fall below 10%. In this case, liquidity fees should adequately reflect the cost to the MMF of achieving liquidity and ensure that investors who remain in the fund are not unfairly disadvantaged. The fund can also be gated, for a period of up to 15 working days.

Chinese MMFs are typically CNAV, although one VNAV fund was established in 2019. Chinese MMFs are mostly held by retail investors, although the share of institutional investors has been growing. MMFs can invest in bank deposits, repos, central bank bills and interbank CDs with a maturity of up to one year, and in bonds, debt financing instruments of non-financial corporates and asset backed securities with a maturity of up to 397 days. They have a liquid assets requirement of 5% of NAV, with more stringent requirements if the ownership of fund shares is concentrated.

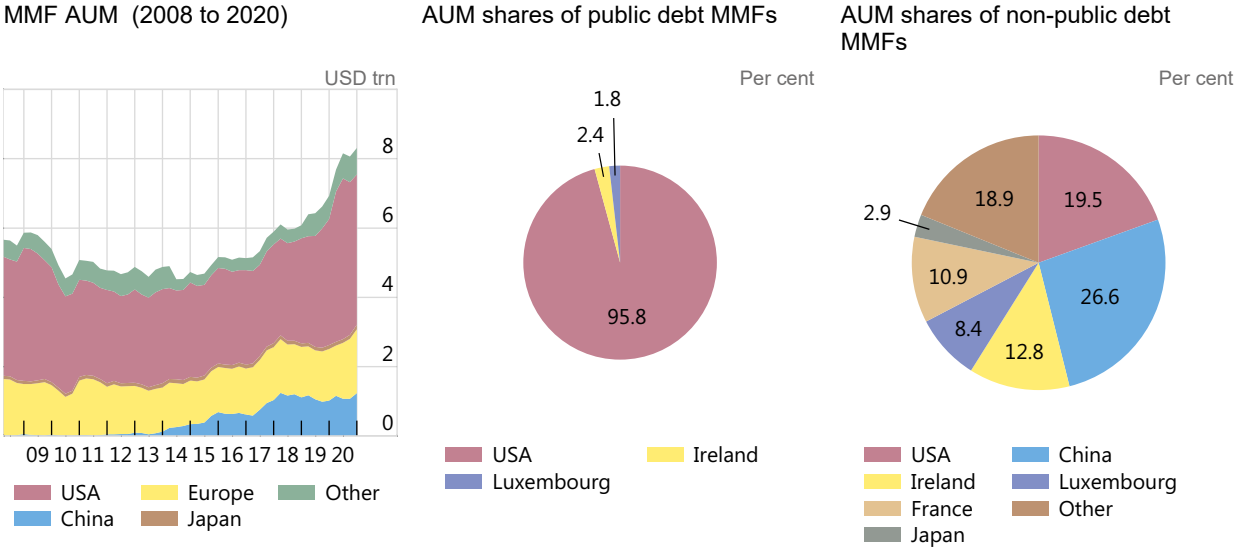
MMFs in Japan are used by broker dealers for the purpose of settlement and pooling of retail investor cash, as these broker dealers are not allowed to accept deposits. Given this specific purpose, MMFs are structured as CNAV and their weekly liquid asset ratio requirement stands at 30%.

MMFs in South Africa are mostly CNAV and are accessible to both retail and institutional investors, with an increasing uptake by institutional investors such as corporate treasurers.

As of the end of 2020, worldwide assets under management (AUM) in MMFs totalled approximately $8.8 trillion (see Figure 1).[5] The US is the largest market with $4.8 trillion of AUM, followed by China ($1.2 trillion), Ireland ($751 billion), France ($506 billion) and Luxembourg ($479 billion). In the US, public debt ("government") MMFs, which invest exclusively in sovereign and other government securities and repo backed by them, account for most of the sector's AUM. In other jurisdictions, non-government funds are more prevalent.

MMFs are usually denominated in local currency except in the EU, where less than half of MMFs (45% by AUM) are EUR-denominated, while MMFs denominated in USD and GBP represent 33% and 22% of AUM respectively. Such investing in instruments denominated in foreign currencies, as well as cross-border funding, particularly for internationally active banks, underscore the importance of an international perspective in examining the roles of MMFs and potential options for improving their resilience.

Assets under management of MMFs across jurisdictions by type of fund **Figure 1**



Note: for Ireland and Luxembourg, figures include USD, EUR and GBP denominated funds. Data for the US exclude MMFs that are not offered to the public.

Sources: ICI; IIFA; iMoneyNet; FSB.

2.2. MMFs in the broader short-term funding ecosystem

MMFs are important investors in STFMs. Non-public debt MMFs are particularly active in the CP, negotiable CDs and repo markets.[6] The CP and CDs markets are considerably smaller than repo markets in key MMF jurisdictions (see Figure 2). At the end of 2020, the volumes of CP and CD outstanding in the US, EU and Japan were USD 1.5trn (USD 1trn in CP, USD 500bn in CDs), EUR 534bn (EUR 372bn in CP, EUR 162bn in CDs) and USD 583bn (USD 228bn in CP, USD

5 Unless otherwise noted, all data in this report are as of 31 December 2020.

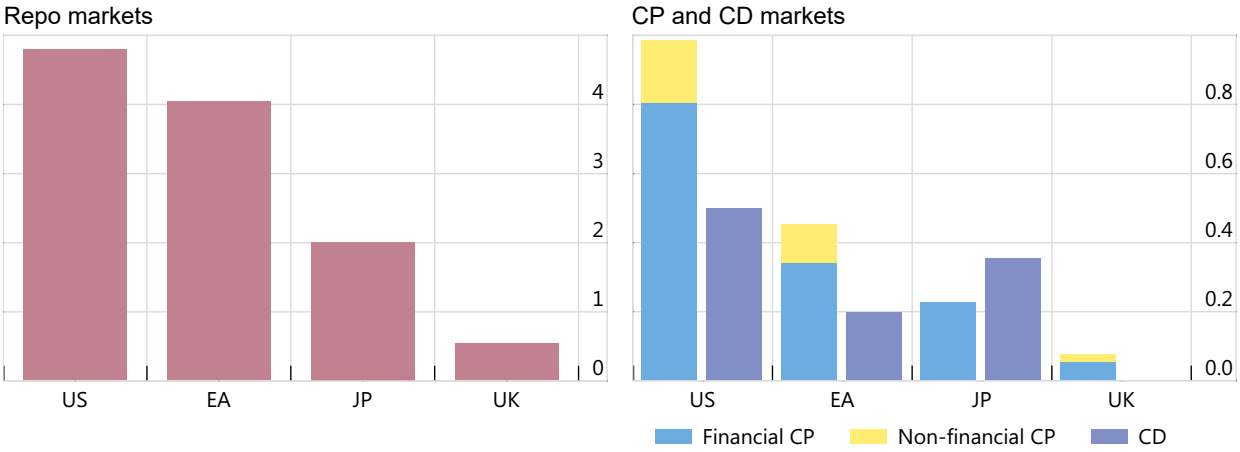
6 Participation in these markets varies by jurisdiction and type of fund. In the US, as of December 2020, close to 80% of the total MMF industry net assets were managed by government MMFs that do not participate in CP or CD markets.

355bn in CDs), respectively. This compares to a repo market size in the US of nearly USD 5trn, in the EU of approximately EUR 3.3trn and in Japan of approximately USD 2trn.[7]

Size of STFMs[1]

In trillions of US dollars

Figure 2



[1] Estimates are based on members' submissions. UK data refer to markets denominated in GBP rather than domiciled in the UK (information on the size of the CD market is not available).

Sources: Member submissions; FSB calculation.

Box 2 provides a high-level overview of the structure and functioning of CP, CD and repo markets in key MMF jurisdictions,[8] while a visual depiction of the money market ecosystem in which MMFs operate is shown in Figure 3.

MMFs form a large part of the STFMs in many jurisdictions (see Table 1). Funds domiciled in the Euro Area hold large shares of the markets for unsecured money market instruments. US MMFs hold larger amounts of these instruments in dollar terms but have smaller footprints in their markets. In Japan, MMFs play a smaller role in SFTMs, where they hold only 13% of CP instruments and typically do not invest in repo or CDs. US MMFs are significant participants in repo markets, with holdings that account for around 22% of the outstanding amount. Most of this repo is held by government MMFs that conduct repos backed by US government securities. Repo is a much smaller share of MMF portfolios in other jurisdictions.

In some cases, particularly for USD MMFs, the combined market footprint of MMFs as investors across jurisdictions is more substantial than the footprint of funds domiciled in any single jurisdiction. For example, USD MMFs domiciled in the EU and US combined hold about 32% of USD-denominated financial CP.

7 By way of comparison, bank deposits in the US total approximately USD 15trn, in the EU they total EUR 11.6trn and in Japan USD 15trn. The size of the investment grade corporate bond market is approximately USD 8.9trn in the US, EUR 5.7trn in the EU, and USD 0.6trn in Japan.

8 Other STFM segments, not covered in this report, include short-term government bills, medium-term notes, variable-rate demand obligations, foreign exchange swaps, securities lending, prime brokerage and lines of credit.

Table 1: MMF investments in selected jurisdictions as of end-2020 (USD bn)

		US	US (including EU MMF holdings of US instruments)	Euro Area (only for domestic issuers and holders)*	Euro Area (euro issuance only)*	UK**	Japan	China
Financial CP (including asset-backed CP)* **	Size	806	806	125	341	55	228	181
	MMF Investment	199	262	100	183	48	29	53
	Footprint	25%	32%	80%	54%	88%	13%	29%
Non-financial CP* **	Size	181	181	77	113	23	Included in financial CP	981
	MMF Investment	33	82	43	76	3		61
	Footprint	18%	45%	56%	67%	12%		6%
CD	Size	499	499	198	199	N/A	355	1732
	MMF Investment	126	200	146	127	109	0	363
	Footprint	25%	40%	74%	64%	N/A	0%	21%
Repo	Size	4798	4798****	4032		530	2009	2320
	MMF Investment	1069	1177	208		31	0	320
	Footprint	22%	25%	5%		6%	0%	14%

Notes: estimates are based on members' submissions (US data on CP and CDs are from DTCC Solutions LLC, an affiliate of The Depository Trust & Clearing Corporation). * The data for both Euro Area columns on the CP and CDs markets are from the ECB Securities Holding Statistics and Centralised Securities database. The first column only includes paper issued by euro area issuers and held by euro area holders, while the second column includes all paper issued in euro irrespective of the domicile of the issuer. Data for the repo market are from the ECB Money Market Statistical Reporting and include repo trades denominated in euro conducted by the biggest banks in the euro area which are subject to money market statistical reporting obligations. ** UK data refer to MMFs denominated in GBP rather than domiciled in the UK and so may be partially included in the Euro area figures. *** The amounts shown include holdings by central banks, such as via facilities designed in response to COVID-19 to support the CP market. **** Excludes segments outside US repo market, which are available to USD-denominated European MMFs. Hence, the MMF footprint in the USD repo market is potentially overstated.

MMFs operate alongside and interact with other key participants in STFMs. This includes, in addition to other investors (such as investment funds) and corporate borrowers, the dealers that intermediate transactions in those markets.

Dealers, especially those affiliated with large banks, play a crucial role as intermediaries in the repo market and in primary markets for CP and CDs. Dealers help issuers sell their paper to investors, including MMFs, and provide other services to those issuers. However, dealers typically are not active in making secondary markets for CP and CD instruments, even under normal market conditions. Investors, including MMFs, tend to buy and hold these instruments to maturity and often reinvest the proceeds of maturing assets in the obligations of the same issuers. As a result, trades in the secondary market are less common, and there is limited demand for dealer intermediation services under normal market conditions. Moreover, dealers have limited economic incentives to make markets in these short-dated instruments in normal times. Instead, they tend to limit their activities to primary market activities and occasionally buy back paper that they originally placed in response to requests from their clients, although dealers are under no contractual obligation to do so.

Box 2: The structure and functioning of CP, CD and repo markets in key MMF jurisdictions

CP is typically issued by large highly-rated corporations (financial and non-financial) as well as local government entities. The largest issuers are banks, which issue CP to secure wholesale funding for general use. CP can be issued either directly by an entity that needs to raise funding or through a bank dealer. Non-financial issuers generally use the latter path. In the US, the large majority of CP matures within 60 days, the interest rate is usually fixed and the largest borrowers are US branches of foreign banks, which rely on the CP market to meet their US dollar funding needs. In the EU, 50% of the paper has a maturity below 6 months and the rest is between 6 and 12 months. Some of the paper is issued in US dollars and pound sterling and the largest borrowers in the market are EU banks. Bank issuers of CP in both the US and the EU have reduced their reliance on this market for funding needs in recent years.

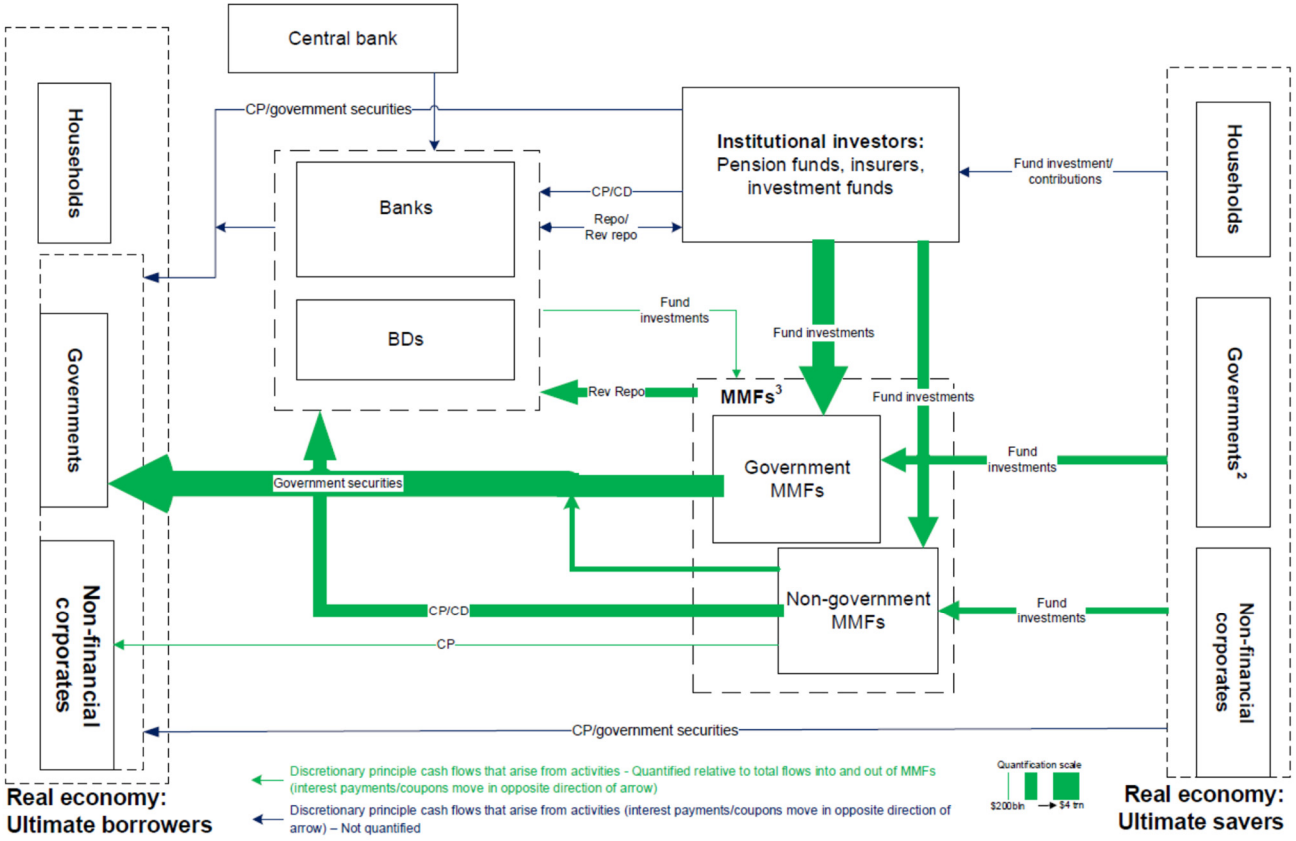
CDs are only issued by deposit-taking institutions (banks). Information on the CD market is less comprehensive than that for CP. The maturity of negotiable CDs issued in USD is generally longer than that of CP, but still shorter than one year, and floating rates are more common. In the EU issuance in GBP is more common in CDs than in CP. In Japan, the secondary market is dormant and issuing banks are not allowed to purchase CDs they issued or to accept withdrawal of the deposit before term. Banks are also prohibited from intermediating their own CDs.

The demand for CP and CDs comes from investors looking for greater yield than bank deposits or short-term government securities in exchange for taking on additional credit and liquidity risk. In addition to MMFs, these investors include non-financial corporations, financial firms, mutual funds, government entities and pension funds.

The repo market brings together institutions that seek short-term funding, especially to finance securities (e.g. pension funds, hedge funds and insurance companies), and investors that provide cash against collateral (e.g. MMFs or corporate treasurers). Banks and broker-dealers are also significant users of repos to fund their other activities. Most of the repo collateral consists of government securities, but it can also include other types of securities. Repos secured by US Treasuries can be cleared by a central counterparty (CCP) or not (dealer-to-client). The settlement of the trade can take place on a triparty platform or bilaterally. In the EU around 70% of repo turnover is cleared by a CCP and in the US the cleared segment is the largest one. Repo contracts are often conducted on an overnight basis and tend to be rolled over – for example, in the US and EU overnight repo is by far the most frequent trade but longer maturities are also present. CCPs concentrate on short-term trades, while longer term trades tend to be bilateral.

MMFs and the money market ecosystem

Figure 3



1 This graphic includes only money-market securities.
2 Includes non-central government use of MMFs for cash management, e.g. local authorities, FX reserves/portfolio management.
3 Government MMFs are mainly CNAV funds, non-government funds include both CNAV and VNAV funds. LVNAV funds could span across both MMF types in some jurisdictions.

Notes: green lines show cash flows, while green arrows depict the direction of the cash payments made at the inception of these transactions (e.g. purchase of MMF shares or purchase of CP). Subsequent payments (e.g. when MMF shares are redeemed or CP principal is returned at maturity) may move in the opposite direction. The thickness of these lines reflects the relative size of investments into a MMF from various participants, and the relative share of funds that are invested in different counterparties. Quantification is based on information from Ireland, Luxembourg, Netherlands, France, Japan, UK and US. Dark blue lines are similar to green lines, but are not quantified.

2.3. MMF functions for investors and borrowers

MMFs attract a broad range of investors, including retail (individual) investors and a variety of institutional investors, although investor types are more limited in some jurisdictions (see Table 2). MMF investors are exclusively retail in Japan and mostly retail in China (63% as of end-2020). In the US, the share of retail investors is about 30%, while in Europe (including GBP-denominated MMFs domiciled in the EU) institutional investors are dominant and retail investors hold insignificant portions of MMF shares.

Table 2: Investor shares in MMFs in selected jurisdictions

	US	France	Ireland	Lux	Japan
Retail	31%	1%	0%	4%	100%
Non-financial corporations	21%	22%	17%	25%	0%
Financial Intermediaries	15%	31%	77%	49%	0%
Investment funds		22%	4%	18%	0%
Other	33%	23%	2%	3%	0%

Note: FSB estimates. "Other" includes rest of the world investors that are a significant share of MMF investment.

MMFs have several features that, from the viewpoint of their investors, make them attractive for cash management and short-term investment. They generally aim to provide principal stability and offer liquidity on a daily basis, so that investors often consider MMF shares to be cash-equivalent. In addition, MMFs pay yields in line with market rates – which are typically higher than bank deposit rates – by providing low-cost exposure to wholesale money market instruments for investors, including smaller investors who otherwise would not readily have access to these instruments. By holding a variety of instruments issued by different counterparties, MMFs also offer investors more diversified credit risk exposures than uninsured bank deposits or direct investment in money market instruments.

MMFs are also an important source of short-term funding for a variety of institutions, businesses and governments, in a number of currencies. While the mix of borrowers (or issuers) varies by jurisdiction, the most significant borrowers globally are banks and governments. Non-bank financial firms, non-financial corporations and public non-sovereign entities are significant borrowers in some jurisdictions. Access to financing from MMFs is generally limited to entities that have high credit quality or access to credit and liquidity enhancements for their obligations.

Banks are the largest recipients of funding from MMFs and account for more than half of the financing extended by MMFs in large jurisdictions other than the US. In China and Japan, MMFs have claims mainly against domestic banks, but MMFs in other jurisdictions mostly provide financing to foreign banks. In two of the three largest EU domiciles for MMFs, Ireland and Luxembourg, about 60% of aggregate MMF assets ($744 billion) comprise a mix of dollar, sterling, and euro funding to banks from other countries, in part due to the fact that euro area borrowers obtain funding, including in foreign currency, from MMFs in these countries. This implies that MMFs are highly exposed to the banking sector as they invest in the paper issued by banks.

A substantial share of internationally active banks' funding is denominated in foreign currencies.[9] Even though MMFs' relative share of funding for those banks has declined in recent years, MMFs still represent an important source of CP, CDs and repo funding for them. In the US, and in the EU for USD-denominated funds, MMFs provide wholesale dollar funding for banks headquartered outside the US that do not have access to insured retail dollar deposits. However, as illustrated by the financial crisis in 2008, the European sovereign crisis of 2011-2012, and the COVID-19 crisis in March 2020, US dollar funding sourced from MMFs can be unreliable during times of stress.[10] The similarity of the portfolios and vulnerabilities of these USD-denominated MMFs suggests some benefit in developing convergent approaches across jurisdictions to address these vulnerabilities.

Financing from MMFs offers several advantages to borrowers, including cost savings, diversification (by providing access to intermediated funding from a large pool of investors) and flexibility of funding, and (in some jurisdictions) the ability to access foreign currencies. For entities with creditworthiness high enough to borrow from MMFs, short-term secured or unsecured funding is typically cheaper than alternative sources such as bank loans. This difference, however, may not be an accurate measure of the cost savings due to the availability of funding from MMFs. For example, even a significant reduction in the size of non-government MMFs in the US in 2015-2016 did not cause material increases in USD funding costs.[11] In addition, cost differentials for different types of short-term funding may reflect some unpriced risks (externalities) that may be borne outside of these markets or that market participants expect to be mitigated through the intervention of central banks or governments.

2.4. Potential substitutes for MMFs

Potential MMF substitutes for investors include some entities that provide cash management functions and others that provide services more akin to those of investment funds. The definition of a MMF and accounting rules, which can vary across jurisdictions, also affect what can serve as a substitute (see Box 1). These substitutes offer different features for investors than MMFs, and their activities may have different implications for the resilience of STFMs. No substitute can have the exact same characteristics of MMFs (and a substitute that had all of the characteristics of MMFs also would likely share their vulnerabilities). However, the alternatives described below do share some of the specific features of MMFs, i.e. the provision of principal stability, daily liquidity, risk diversification and returns consistent with prevailing money market rates. Not all substitutes share all of these characteristics, but they are close enough that investors and borrowers may use them if the size of the MMF industry were to shrink.

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9 See Aldasoro et al, *Dollar funding on non-US banks through Covid-19*, BIS Quarterly Review (March 2021).

10 See, for example, Baba et al, *US Dollar Money Market Funds and Non-US Banks*, BIS Quarterly Review (March 2009); Egemen et al, *US dollar funding markets during the Covid-19 crisis – the money market fund turmoil*, BIS Bulletin No. 14 (2020); ECB, *Financial Stability Review* (June 2011); Ivashina et al., *Dollar Funding and the lending behaviour of global banks*, Quarterly Journal of Economics (2015); and Chernenko and Sunderam, *Frictions in Shadow Banking: Evidence from the Lending Behavior of Money Market Mutual Funds*, Review of Financial Studies, 27 (2014).

11 In the year before the October 2016 implementation deadline for the SEC's 2014 reforms, aggregate prime MMF assets shrank by $1.2 trillion (69%). To the extent that spreads for instruments held by these MMFs were affected, they generally widened only temporarily. See, for example, Anadu and Baklanova, *The Intersection of U.S. Money Market Mutual Fund Reforms, Bank Liquidity Requirements, and the Federal Home Loan Bank System*, OFR Working Paper 17-05 (2017).

Bank deposits are one potential cash management substitute for MMFs, but they offer less diversification for large investors. Moreover, banks in some jurisdictions have discouraged such investors from holding sizable deposits because of their impact on banks' regulatory ratios and profitability, particularly if short-term interest rates are negative.

For non-public debt MMFs, substitutes include public debt MMFs, at least for jurisdictions where they are available. Relative to non-public debt MMFs, these substitutes offer investors safety and liquidity, but they typically pay lower rates (yields). Other investment-like substitutes for non-public debt MMFs include fixed income funds that invest in short-dated assets (short-term bond funds).[12] These substitutes can offer investors yields comparable to those of non-public debt MMFs. However, short-term bond funds have larger fluctuations in value. For some institutional investors,[13] direct investment in money market instruments is another alternative. Direct investing generally does not offer the liquidity on demand that MMFs offer, and those investors must either use separately managed accounts or set up – at substantial cost – their own investment programmes to get the same level of diversification and yield.

For borrowers, one alternative source of funding is from banks, which may be more costly than from MMFs. Bank loans also represent a more concentrated source of funding compared to issuing debt in STFMs (including to MMFs). Another potential source of funds is public debt MMFs, although they only provide funding to governments, other public entities, and firms that can participate in repo markets. An additional source of funding for borrowers may be large institutional investors that normally invest outside money markets, including other open-ended funds, pension funds, and insurers. If yields rise relative to other investments, such investors might enter money markets and provide funding for borrowers.

Reforms that substantially alter the features of MMFs may result in growth of some or all of these substitutes. An assessment of MMF reform options should examine whether they would alter MMF features, including their cash management functions, as well as the options' impact on resilience. That information, along with historical evidence, is useful in predicting the types of substitutes that investors are likely to turn to. For example, options that diminish the cash management functions of MMFs could result in material growth in substitutes that provide those functions, and the US reform experience in 2016 – when government MMFs grew very significantly as prime MMFs shrunk – corroborates that view.

In addition, the potential for growth of substitutes will depend on which substitutes are available (or could become available) in each jurisdiction. Finally, reforms that bring significant changes for MMFs could result in the emergence of new substitutes, which is more difficult to predict. Such developments could have important effects on investors and borrowers, since they could shift the risks to other parts of the financial system. A potential for risk-shifting should not delay addressing vulnerabilities in STFMs, including those related to MMFs, that were apparent in recent episodes of stress. The basis for the analysis of these effects is included in the assessment of the individual reform options (see section 4).

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12 The potential for short-term bond funds to serve as substitutes may vary by jurisdiction. For example, ultrashort bond funds in the US might be considered as MMF substitutes, but in the EU, similar funds might be regulated as standard VNAV MMFs.

13 These are sophisticated investors that are operationally capable of holding assets directly.

3. Vulnerabilities in MMFs

MMFs are subject to two broad types of vulnerabilities that can be mutually reinforcing: they are susceptible to sudden and disruptive redemptions, and they may face challenges in selling assets, particularly under stressed conditions. These vulnerabilities have been studied extensively in the academic literature[14] and documented in official reports and rulemakings.[15] In practice, these vulnerabilities have been significantly more prominent in non-public debt MMFs than in public debt ones.

In addition, potential substitutes of MMFs also exhibit vulnerabilities. Consideration of these vulnerabilities, and how they compare to those of MMFs, is important in assessing the broader likely impacts of MMF reform options for the resilience of the STFMs.

3.1. Crisis experience and policy responses

The susceptibility of non-public debt MMFs to sudden and disruptive redemptions in episodes of stress has been evident in a number of jurisdictions, most notably among US and European MMFs in September 2008 and March 2020. The large redemptions (and runs) on non-public debt MMFs in 2008 were triggered by a credit crisis, the bankruptcy of Lehman Brothers, and a loss of principal for a large prime MMF in the US that "broke the buck." In contrast, in 2020, redemptions arose from a liquidity event (the "dash for cash"), which resulted from pandemic-related uncertainties and increased cash demands from corporations and other investors.[16]

MMFs in some other jurisdictions did not experience stress (China and Japan) or experienced little stress (South Africa) in those episodes. This may have been due to the specialised functions of funds in these jurisdictions and the fact that in some cases market practice limited the extent of liquidity transformation. However, MMFs in these jurisdictions are not immune from vulnerabilities. For instance, a number of MMFs that were available at the time "broke the buck" in Japan as a result of the Enron scandal in 2001[17] and in South Africa following the collapse of a bank in 2014.

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14 See, for example, Hanson et al, *An Evaluation of Money Market Fund Reform Proposals*, IMF Economic Review (2015); Chernenko and Sunderam, *Frictions in Shadow Banking: Evidence from the Lending Behavior of Money Market Mutual Funds*, Review of Financial Studies (2014); Kacperczyk and Schnabl, *How Safe Are Money Market Funds?*, Quarterly Journal of Economics (2013); Schmidt et al, *Runs on Money Market Mutual Funds*, American Economic Review (2016); and Jank and Wedow, *Sturm und Drang in money market funds: When money market funds cease to be narrow*, Journal of Financial Stability (2015).

15 See, for example, the US President's Working Group (PWG) report on *Money market fund reform options* (2010); IOSCO *Policy recommendations for money market funds* (2012); US Financial Stability Oversight Council, *Proposed recommendations regarding money market mutual fund reforms* (2012); EU Commission, *IMPACT ASSESSMENT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Money Market Funds* (2013); SEC, *Money Market Fund Reform; Amendments to Form PF* (2014); IOSCO, *Thematic Review on consistency in implementation of Money Market Funds reforms*, (2020); FSB, *Holistic Review of the March market turmoil* (2020); PWG, *Overview of Recent Events and Potential Reform Options for Money Market Funds* (2020); and ESMA, *Consultation on EU money market fund regulation - legislative review* (2021).

16 These events are described in the reports mentioned in the previous footnote. See also Investment Company Institute, *Experiences of US Money Market Funds During the COVID-19 Crisis* (November 2020) and Institutional Money Market Funds Association, *Position paper on money market funds* (July 2020) for a private sector view of the events in the US and Europe.

17 In Japan, the type of MMF that "broke the buck" in 2001 ceased to exist in 2016 after the introduction of negative interest rates (see Annex A for details).

Figure 4 illustrates the scale of MMF redemptions in 2008 and 2020. In both episodes, non-public debt funds experienced large net outflows while public debt funds attracted large net inflows. Although the sources of stress were different in each episode, some of the repercussions were similar. Large redemptions in MMFs contributed to sharp increases in the cost of short-term funding for borrowers and a reduction in availability of some types of short-term funding, such as term CP and negotiable CDs, including USD-denominated instruments issued by non-US banks.[18]

The strains in CP and CD markets can amplify shocks and affect cross-border short-term funding for large, internationally active banks.[19] As noted above, MMFs in some jurisdictions invest heavily in bank paper; about 60% of the portfolio investments of MMFs in Ireland and Luxembourg are obligations of banks from other jurisdictions, while foreign-bank obligations represent 46% of holdings of US prime MMFs. In addition, CP rates enter as inputs into credit-sensitive benchmark rates, and hence through pricing channels of propagation.[20] Hence the outstanding notional value of CP and CDs may understate their systemic importance.

During the March 2020 turmoil, MMFs and other investors sought to preserve liquidity by not refinancing maturing investments. Dealers received an unusually high number of client buy-back requests, but were unable to accommodate all of them given the size and one-directional nature of the flows. Investors were thus unable to sell their holdings quickly at current prices and at their desired scale. No single factor can, on its own, explain dealer behaviour during the turmoil (see Box 3). Dealers provide little secondary market intermediation in normal times, given the 'buy-and-hold' nature of CP and CD markets, and are unlikely to intermediate large one-directional flows in stress. The March 2020 experience showed the limits in the ability of dealers to intermediate these markets, particularly amid such a sizable liquidity shock.

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18 See FSOC (2012); FSB (Holistic Review 2020); PWG 2020; Baba et al, *US Dollar Money Market Funds and Non-US Banks* (BIS Quarterly Review, March 2009); Eren et al, *US dollar funding markets during the Covid-19 crisis – the money market fund turmoil*; and Schrimpf and Sushko, US dollar funding markets during the Covid-19 crisis – the money market fund turmoil, BIS Bulletin No. 14 (2020).

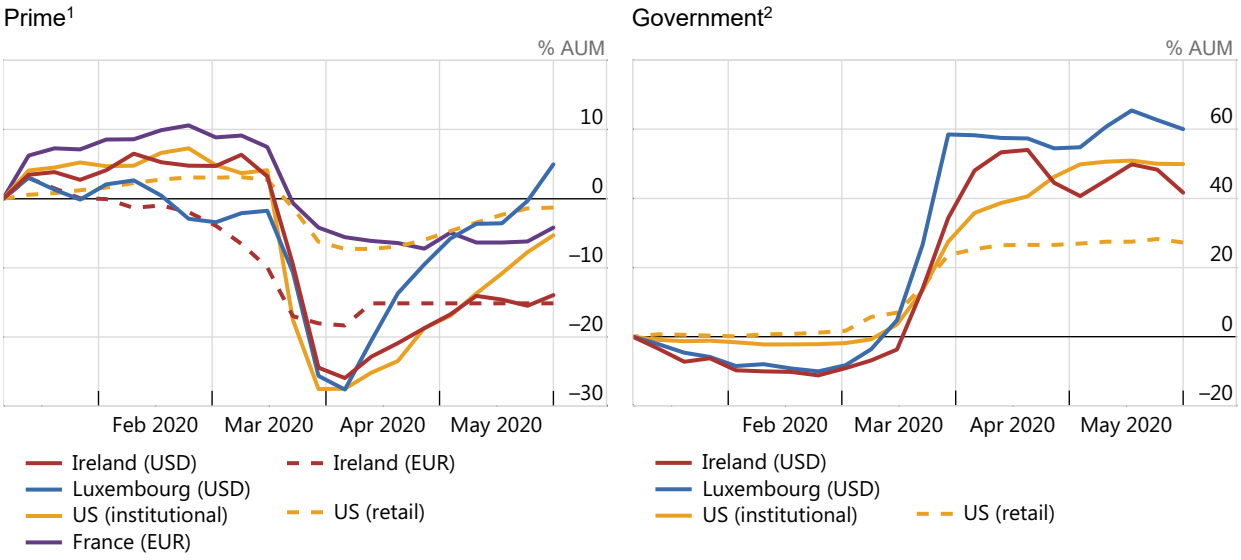
19 See, for example, Schrimpf and Sushko, *US dollar funding markets during the Covid-19 crisis – the international dimension*, BIS Bulletin No. 15 (2020); and Aldasoro et al, *Dollar funding of non-US banks through Covid-19*, BIS Quarterly Review (2021). The importance of CP and MMFs for banks was also shown in 2011 during the period of sovereign stress in the euro area. US prime funds reduced their exposures to Euro area banks from 30% of their AUM to less than 10%, resulting in dollar funding issues for the banks – see van Rixtel and Gasperini, *Financial crises and bank funding: recent experience in the euro area*, BIS Working Paper 406 (2013).

20 Continued demand for credit-sensitive benchmarks for hedging purposes suggests that CPs will remain key inputs even after the discontinuation of LIBOR.

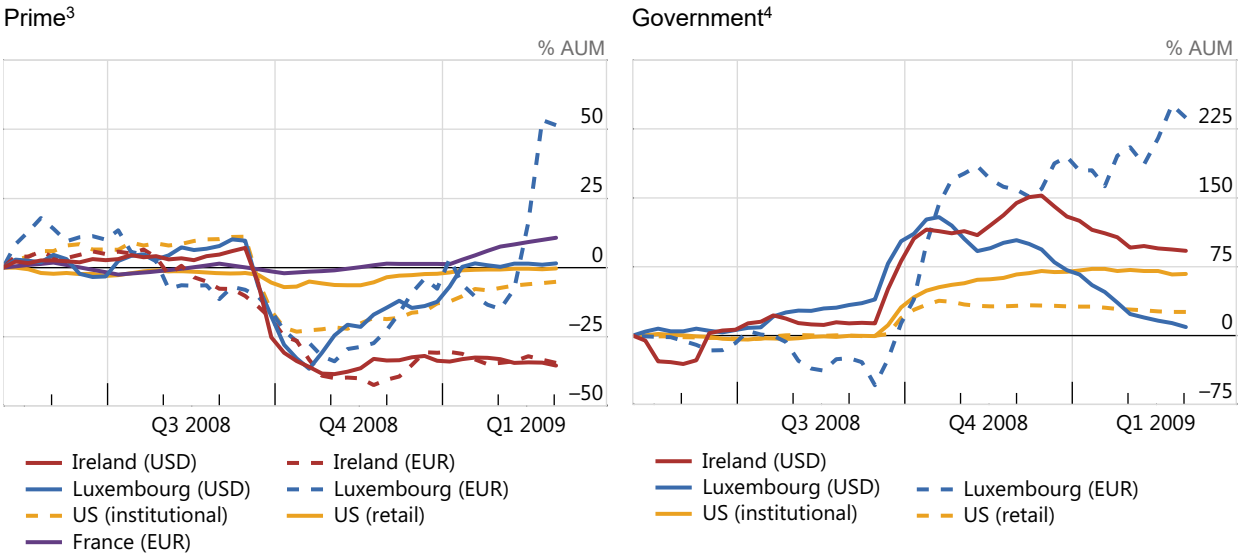
Cumulative MMF flows in 2008 and 2020

Figure 4

March 2020 market turmoil



2008 financial crisis



[1] LVNAV for Ireland and Luxembourg. Data for the US exclude MMFs that are not offered to the public.

[2] Public Debt CNAV for Ireland and Luxembourg. [3] Prime stable NAV for Ireland and Luxembourg.

[4] Government stable NAV for Ireland and Luxembourg. Due to the data quality, euro-denominated Irish funds flow for government stable NAV is not displayed for the period 2008-2009.

Sources: ICI; iMoneyNet, Banque de France.

In both the 2008 and 2020 stress episodes, redemptions from MMFs did not abate until central banks and governments in several jurisdictions intervened in a decisive and substantial way. These interventions, including some directly targeted at MMFs, alleviated stress in STFMs through various channels.[21] These official actions also relieved stress in the STFMs more

[21] These included central bank asset purchases, which in some cases involved risk assets including CP; liquidity operations, which provided broad-based liquidity support and helped anchor funding rates (including by widening the pool of eligible collateral); backstop facilities to provide targeted liquidity to specific financial entities; and regulatory measures (MMFs are unable to receive external support under the MMFR in the EU). See the FSB Holistic Review of the March market turmoil (November 2020).

broadly, although significant cross-border funding and investing flows in some cases limited the reach of authorities' interventions.

Box 3: Drivers of dealer behaviour in STFMs during the March 2020 turmoil

The very high uncertainty in March 2020 made it particularly difficult for dealers to manage their risk. This stemmed from the very strong imbalance in the market, where all investors were scrambling to raise cash; the unwillingness of dealers to build up long credit positions that they may have needed to keep on their balance sheet for a long time; and the lack of clarity on whether central banks would intervene. The uncertainty may have reduced dealer appetite for intermediation.

Dealers provide little secondary market intermediation in normal times, given limited investor demand for liquidity in 'buy-and-hold' CP and CD markets. Dealers often accept requests in normal times to buy back paper that the dealer placed or sold to maintain a good relationship with their clients, but there is no contractual obligation on dealers to buy back paper. In at least some cases, dealer balance sheets expanded substantially in March 2020 to accommodate liquidity demands from investors. However, as seen during this episode, dealers are unlikely to intermediate large one-directional flows in stress.

In March 2020, dealers were also facing demands on liquidity in other parts of their business. In particular, corporates drew down their existing credit lines and revolving credit facilities, while investors became less willing to advance funds in the short-term unsecured market. The deteriorating conditions in unsecured STFMs limited banks' access to diversified funding sources. Market participants also experienced higher margin calls from CCPs to reflect higher market risk.

Internal risk management limitations (e.g. risk appetite, internal risk models, or internal limits) also played a role. Internal risk management functions responded to the increased level of uncertainty, higher perceived credit and market risks, and multiple liquidity demands by taking defensive postures and not allowing balance sheets to expand significantly.

Prudential requirements were not a dominant factor in determining behaviour, but may have influenced behaviour in a number of ways. Higher capital and liquidity requirements ensured that banks were properly resourced and could absorb the shock rather than amplify it through deleveraging, as was the case in the 2008 financial crisis. These requirements affect how dealers manage their balance sheet capacity. Reductions in unsecured funding, including due to buyback requests from various counterparties, may have negatively affected bank liquidity ratios and hence incentives to engage in further buyback activity. In addition, leverage ratio requirements might have limited the expansion in repo activity, contributing to sharp increases in rates in some jurisdictions. Finally, concerns about quarter-end regulatory disclosures in a highly uncertain market environment may have played a minor role in limiting appetite for balance sheet use.

The move to a home working environment may have compounded these challenges, especially in the initial phase of the turmoil. Some dealers reduced their intermediation activities during that phase as they adapted to a new regime in which their workforce was no longer operating in the office and was learning to interact with other departments while working from home.

Notwithstanding these factors, there are clear limits in the ability of dealers to intermediate these markets given the size of the liquidity shock. The market was flooded with one-way flows from MMFs and other investors seeking to sell paper and issuers looking to raise cash. Liquidity demands were not limited to STFMs and were much greater than dealers' capacity to meet them, raising questions about the ability of dealers to intermediate these flows on their own.

Authorities in several jurisdictions have responded to MMF vulnerabilities with a number of reforms since the 2008 financial crisis (see Box 4). However, the experience of the turmoil in March 2020 highlighted that vulnerabilities in MMFs remain. Absent the extraordinary official sector interventions, it is likely that stress in these markets would have worsened significantly,

which would have impaired the ability of firms to raise funds. However, these interventions did not mitigate the underlying vulnerabilities that contributed to the stress. As such, further reforms are needed to enhance MMF resilience. In addition, even though recent stresses manifested primarily in non-public debt MMFs, similar vulnerabilities may be present in public debt MMFs in some jurisdictions.

Box 4: Post-crisis MMF reforms

The US SEC amended rule 2a-7 of the Investment Company Act in 2010. The aim was to reduce interest rate, credit and liquidity risks within MMFs, enhance risk management requirements by mandating periodic fund-level stress testing, and make MMFs more transparent vehicles by specifying disclosures to investors.

In the EU, the Committee of European Securities Regulators (ESMA's predecessor) published guidelines in 2010 to create a harmonised definition of the term “MMF” and to establish new common standards addressing the failures identified during the financial crisis. The guidelines established a classification that created two types of MMFs: (1) “short-term” MMFs; and (2) standard MMFs, imposing strict standards in terms of portfolio quality and maturity, risk management and disclosure.

Other jurisdictions, such as China, made changes to their MMF regulation by introducing shorter maturity limits and imposing liquidity buffer requirements.

In 2012, IOSCO published a set of recommendations that provide the basis for common standards of regulation and management of MMFs across jurisdictions. They cover key principles for valuation, liquidity management and the use of ratings and disclosure to investors to strengthen MMF oversight, mitigate first mover advantage and prevent contagion risk to other parts of the financial sector.[22]

In the US, Rule 2a-7 was further strengthened in 2014 to address MMFs susceptibility to heavy redemptions under stressed conditions and reduce the potential contagion effect of such redemptions. The 2014 reforms required all institutional prime MMFs to convert to variable NAV and created a requirement that fund boards consider the implementation of liquidity fees and redemption gates should the weekly liquidity ratios of their fund fall below 30%.

The European Union adopted the MMFR (EU) 2017/1131, which has been in application since 21 July 2018 (since 21 January 2019 for MMFs that existed on 21 July 2018). The MMFR aims to make MMFs more resilient and resistant to contagion risk by prohibiting sponsor support and imposing rules on portfolio diversification, maturity, valuation of assets and on the type of assets MMFs may invest in (i.e. asset eligibility). It also created new categories of short term MMFs – Low Volatility NAV (LVNAV) MMFs – that can offer a constant NAV per share if they meet certain requirements and which can continue to use amortised cost accounting for valuation purposes.

In China, the CSRC adopted new regulations to reduce risk, increase liquidity and improve disclosures for domestic public MMFs in 2015, and announced additional reforms including new reserve capital limits, single investor limits and restrictions on eligible assets in 2017.

3.2. Types of vulnerabilities in MMFs

The first type of vulnerability, the susceptibility to sudden and disruptive redemptions, arises from the interaction of several characteristics of MMFs (particularly non-public debt funds):

[22] See the IOSCO *Policy Recommendations for Money Market Funds* (October 2012).

1) MMFs perform liquidity transformation, in that redemption terms for their shares are not aligned with the liquidity of the assets they hold. Hence liquidating MMF shares may be easier and more economical for investors than selling other assets, and the incentive to redeem may increase when market liquidity is otherwise scarce or costly. Furthermore, amid a stress event when asset prices are volatile and liquidity conditions are deteriorating, determining current market values for portfolio assets can be challenging, which can make it difficult to accurately determine the value of MMF assets and reflect those values in the funds' NAVs.

2) MMFs are used for cash management by investors who value MMF shares' cash-like features – as described above – and expect these features be maintained at all times. This role exposes the funds to the risk of sudden, large redemptions, as certain investors' cash needs may be hard to predict, large and systemic, such as for margin payments and precautionary build-ups of liquidity during stress periods.[23] Moreover, investors may quickly reassess a fund's suitability as a cash instrument if risks to the fund become salient. The resulting liquidity pressures may be particularly acute for non-public debt MMFs, owing to significant outflows and difficulties in selling assets in markets with little or no secondary market trading.

3) MMFs are exposed to credit risk and even relatively small changes in credit risk may cause investors to abruptly lose confidence in the capacity of MMFs to maintain principal stability. Changes in credit risk may be particularly damaging to investor confidence in stable NAV funds.

In addition, for some MMFs:

4) Regulatory thresholds may cause investors to pre-emptively redeem to avoid the consequences of a fund crossing those thresholds ("cliff effects").[24] For example, crossing certain minimum liquidity thresholds or "breaking the buck/collar" may allow or force funds to impose a fee or gate on redemptions or reprice their shares.

5) Certain types of investors may amplify redemption risks. During the March 2020 market turmoil, many MMFs that cater to institutional investors experienced large redemptions irrespective of their portfolio liquidity, in some cases as investors were forced to meet margin calls.[25] Indeed, institutional investors have proven to be especially sensitive to market developments and can increase the likelihood of disruptive redemptions.[26]

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23 See, for example, Box 8 in ECB *Financial Stability Review* (November 2020).

24 For the US, Li et al. *Runs and Interventions in the Time of Covid-19: Evidence from Money Funds* (2020) show that prime MMFs with low levels of WLAs (that were thus more likely to consider fees and gates) experienced higher outflows than MMFs with high levels of WLAs. Cipriani and La Spada in *Sophisticated and unsophisticated runs* (2020) find that such effects were significant for MMFs sold to institutional investors rather than retail investors. In the EU, Bouveret and Danieli in *Vulnerabilities in money market funds* (2021) show that EU LVNAVs with low WLAs recorded more outflows than MMFs with high WLA, while Capota et al. in *How effective is the EU Money Market Fund Regulation? Lessons from the COVID-19 turmoil* (2021) find that MMFs subject to fees and gates saw higher outflows than similar MMFs not subject to those provisions and that outflows were higher for funds with lower levels of WLA.

25 See, for example Avalos and Xia, *Investor size, liquidity and prime money market fund stress*, BIS Quarterly Review (2021).

26 See, for example, McCabe, *The cross section of money market fund risk and financial crises*, Finance and Economics Discussion Series 2010-51, Board of Governors of the Federal Reserve System (2010); and Schmidt et al, *Runs on Money Market Mutual Funds*, American Economic Review (2016). The differences in redemption risks by institutional and retail investors was the basis for differential treatment in the SEC's MMF reforms adopted in 2014; see the SEC 2014 rulemaking.

Taken together, these features can contribute to a first-mover advantage for redeeming investors in a stress event and thus make individual MMFs (particularly non-public debt funds), or even the entire MMF sector, susceptible to runs.[27] That is, investors have an incentive to redeem quickly, before others do, as those who remain in the fund bear the costs arising from others' redemptions.

The second type of vulnerability – that MMFs can face challenges in selling assets to meet significant redemptions – arises because the funds hold financial instruments that have limited liquidity, particularly under stressed conditions. In normal times, MMFs (especially non-public debt funds) typically fund redemptions through maturing assets rather than asset sales. Some instruments held by MMFs, such as CP and negotiable CDs, typically have little secondary-market trading even under normal market conditions and, as noted above, dealers typically do not intermediate in secondary markets for these instruments. In addition, MMFs tend to hold similar portfolios in these instruments and in some jurisdictions have substantial footprints in money markets, which may hamper simultaneous selling of these instruments. [28]

The vulnerabilities for individual MMFs discussed above may collectively exacerbate financial stress, including stress that originates elsewhere, such as in the March 2020 episode. Some features of MMFs and their uses may create system-wide vulnerabilities in addition to the vulnerabilities that affect MMFs individually. For example, similarities in MMF portfolios may present contagion risks among MMFs, as strains on one fund may affect others that hold similar assets. Common features in fund structure and regulation, such as thresholds, may cause investors to react to news about one fund by redeeming shares from other funds. And the usage of MMFs for cash management and specialised financial functions, such as to meet margin calls, may add a common component to MMF flows that exacerbates stress.

4. Policy proposals to enhance MMF resilience

This section presents a set of policy options that aim to address MMF vulnerabilities. To assess the relative merits of these options in enhancing the resilience of MMFs and STFMs more generally, the section considers their likely effects on the behaviour of MMF investors, fund managers and sponsors; and their implications for the underlying markets, including through analysis of potential substitutes for MMFs to which investors and issuers could turn to. The assessment framework in Annex B sets out in more detail the structured approach used to arrive at a comprehensive assessment of the effects of each option.

4.1. Categorising policy options

As noted in the previous section, MMFs are susceptible to sudden and disruptive redemptions, and they may face challenges in selling assets, particularly under stressed conditions. A number of mechanisms could be used to address these MMF vulnerabilities – they include imposing on redeeming investors the cost of their redemptions; absorbing losses; reducing threshold effects;

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[27] For a discussion of first mover advantage in mutual funds see, for example, Chen, Goldstein, and Jiang, *Payoff Complementarities and Financial Fragility: Evidence from Mutual Fund Outflows*, Journal of Financial Economics (2010) .

[28] On USD MMF portfolio similarity, see Georg et al, *Similar Investors* (2020), and Bouveret and Danieli, *Vulnerabilities in money market funds* (2021).

and reducing liquidity transformation. Some of these proposals were considered in previous MMF reforms, while other proposals are novel.[29]

In developing the policy options within this report, the FSB has sought to group options according to the mechanism through which they aim to mitigate identified MMF vulnerabilities, although some policy options may affect resilience through more than one mechanism.

Under each mechanism, a few representative options have been identified and are described in detail. They are accompanied by other options that are variants or extensions of the representative options. The representative options are intended to illustrate each mechanism used to enhance MMF resilience. They have been chosen based on: (i) their impact on the resilience of MMFs and financial stability more broadly; (ii) their scope (i.e. whether the discussion of the representative option would cover many points relevant to the variant options as well); (iii) operational and other considerations (e.g. impact on MMF industry) that may affect the feasibility of implementing these options; and (iv) their inclusion in recent reviews of MMF reform options in some jurisdictions.[30] These representative options are presented as possible ways a jurisdiction could seek to mitigate the vulnerabilities it has identified within its sector. Nevertheless, the variants may work better in some jurisdictions, depending on the specific circumstances and features of the market. All policy options – both representative options and their variants – should therefore be considered by jurisdictions, to the extent that they are relevant for addressing identified MMF vulnerabilities.

For some of the mechanisms, two options are included as representative options because they operate very differently. The variants or extensions are then compared to the representative options and can also be considered by jurisdictions.

4.2. Assessing potential substitutes for MMFs

Assessing the likely impact of these policy options on the broader functioning of STFMs also requires analysis of potential substitutes for MMFs to which borrowers and investors could realistically turn to, should the implementation of these options lead to a withdrawal of MMFs from STFMs or make MMFs unattractive for investors.

Even if substitutes for MMFs are readily available, the impact of additional MMF restrictions on the aggregate supply and demand for financial intermediation is uncertain, particularly where these restrictions may lead to a shrinkage of the non-public debt MMF sector. On the one hand, as noted above, a substantial shrinkage of non-public debt MMFs in the US following previous reforms did not cause a significant reduction in the availability of short-term funding, as borrowers found alternative sources of funding. On the other hand, the reach of some alternatives may be limited; for example, while some investors can sidestep MMFs by holding assets directly, others – such as retail investors – may not, and direct investment would not readily meet some of the objectives of MMF investors such as diversification. This would mean

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29 See IOSCO, *Policy recommendations for money market funds* (2012), for a detailed description of proposals considered after the 2008 financial crisis.

30 See the *President's Working Group on Financial Markets Report on Recent Events and Potential Reform Options for Money Market Funds* (2020) and ESMA, *Consultation on EU money market fund regulation - legislative review* (2021).

issuers would depend on other types of investors to scale up their lending and borrowing costs might rise, even if only on a transitory basis.

Potential substitutes to non-public debt MMFs that offer cash management functions for investors include bank deposits and public debt MMFs. These products generally exhibit greater resilience and less susceptibility to runs than non-public debt MMFs. For example, prudential regulation and access to central bank liquidity in recent decades have made bank runs more isolated than runs on non-public debt MMFs. And public debt MMFs, particularly those denominated in USD, have attracted large inflows during episodes of stress, even as non-public debt MMFs experienced large net redemptions. However, the attractiveness to investors of public debt MMFs denominated in currencies other than USD is currently limited.

In contrast, investment-like substitutes exhibit varying degrees of resilience compared to non-public debt MMFs. In certain jurisdictions, investors may decide to use short-term bond funds as an alternative to MMFs.[31] The portfolio risks of these types of funds typically are greater than those for MMFs and they also exhibit liquidity mismatch if they allow for daily redemption of their shares, but their limited usage for cash management may offset some of these risks. Direct investment is another potential substitute available to some MMF investors, particularly institutional investors. Direct investment does not offer liquidity transformation, as investors directly bear the cost of liquidating assets, so this substitute is likely more resilient than MMFs.

For borrowers, an additional substitute source of funding may be other large entities and institutions that normally invest outside money markets, including open-end funds, pension funds, and insurers. The effects on financial stability from a shift in funding from MMFs to these alternative providers would depend on which ones absorb any potential reduction in lending by MMFs. For example, open-end funds, like MMFs, engage in liquidity transformation and are subject to redemption risk, whereas such risks are less relevant for pension funds.

[31] In some jurisdictions such as the EU, ultra-short bond funds are generally considered to be standard VNAV MMFs and are therefore subject to MMF regulations.

Table 3: Representative policy options and their variants/extensions by mechanism to enhance resilience

Representative options	Mechanism to enhance resilience	Primary objective	Secondary objective	Extensions and variants
Swing pricing (or economically equivalent measures)	Impose on redeeming investors the cost of their redemptions	Reducing the likelihood of destabilising redemptions	Mitigating the impact of large redemptions	Authorities mandating macroprudential swing pricing
Minimum balance at risk (MBR)	Absorb losses	Reducing the likelihood of destabilising redemptions		
Capital buffer	Absorb losses	Reducing the likelihood of destabilising redemptions	Mitigating the impact of large redemptions	Sponsor support, liquidity exchange bank
Removal of ties between regulatory thresholds and imposition of fees and gates	Reduce threshold effects	Reducing the likelihood of destabilising redemptions	Mitigating the impact of large redemptions	Authorities approving activation of fees and gates, MMF investor concentration limits, countercyclical liquidity buffer
Removal of stable NAV	Reduce threshold effects	Reducing the likelihood of destabilising redemptions		
Limits on eligible assets	Reduce liquidity transformation	Mitigating the impact of large redemptions		Limit MMFs to government MMFs, redemption in kind, non-daily dealing, liquidity-based redemption deferrals
Additional liquidity requirements and escalation procedures	Reduce liquidity transformation	Mitigating the impact of large redemptions	Reducing the likelihood of destabilising redemptions	

4.3. Assessment of policy options

The description and assessment of the representative options within each group is provided below (see Table 3 for a summary). A summary of variants for each representative option is also included here, while the more detailed assessments of those variants can be found in Annex C.

4.3.1. Mechanisms to reduce the likelihood of destabilising redemptions

This sub-section focuses on mechanisms that aim to mitigate the risk of large destabilising redemptions from MMFs in episodes of stress, including by reducing the first mover advantage for redeeming investors.

4.3.1.1 Impose on redeeming investors the cost of their redemptions

Vulnerabilities addressed: MMFs' susceptibility to sudden and disruptive redemptions arises in part because their redemption terms are not aligned with the liquidity of the assets they hold, and shareholders can redeem at no cost, even when market liquidity is otherwise scarce and costly.[32] These features can motivate redemptions and create a first-mover advantage for redeeming investors.

One way to mitigate the risks stemming from the first-mover advantage for redeeming investors is to reduce their incentive to redeem by imposing directly on them the costs of their redemptions. Options that do so also have the benefit of ensuring more equitable treatment of investors (i.e. by protecting remaining investors from the impact of large redemptions) and could allow funds to reflect in their prices the costs arising from redemptions, especially at times when liquidity is particularly costly, as was the case in March 2020 for example. This could reduce pressures on MMFs compared to other sources of liquidity when the demand for liquidity increases.

Representative Option: swing pricing (or economically equivalent measures)

Description: Swing pricing is a mechanism that allows fund managers to reduce the fund's NAV when outflows exceed a "swing threshold". It thus allows asset managers to allocate transaction costs in the best interest of all investors and achieve a more equitable treatment, because transaction costs are borne by investors selling the shares rather than those remaining in the fund. Requiring the introduction of swing pricing in the legal documentation of MMFs would allow those funds to pass on to redeeming investors the cost of their redemptions.

Swing pricing also reduces the impact of redemptions on remaining investors by insulating them from the effects (i.e. dilution of MMF shares' value) of others' redemption activities. Hence, swing pricing can improve a fund's performance (net return) for investors who continue to hold its shares. Moreover, unless the fund suffers a loss due to other factors (such as a credit-related loss), its NAV rebounds to its unadjusted level when outflows ease.

[32] Although MMF regulations in some jurisdictions provide for the ability to impose liquidity fees on redeeming investors under certain circumstances, relevant MMFs generally have not used this tool.

Swing pricing would not be compatible with stable NAV funds, because it causes fluctuations in a fund's NAV. That said, it is possible to implement policies that are economically equivalent to swing pricing by imposing a cost on redeeming investors, in the form of liquidity fees or anti-dilution levies, rather than by changing the fund's NAV, when a fund's same-day outflows exceed a threshold. If swing pricing is particularly difficult to put in place for MMFs in a jurisdiction, it may be appropriate for that jurisdiction to adopt such economically equivalent policies as long as they are implemented in a manner that is likely to pass on to redeeming investors the costs they impose on the fund without creating incentives for pre-emptive runs.

To allocate transaction costs in the best interest of all investors, swing pricing must be implemented in a manner that is likely to fully pass on to redeeming investors the costs they impose on the fund, and authorities may need to establish certain requirements to ensure such an implementation.

Assessment: Swing pricing (or economically equivalent measures) could materially reduce redemption risk and reduce or remove first-mover advantages arising from mutualised liquidity, if it is implemented in a manner that is likely to pass on to redeeming investors the costs they impose on the fund. However, determining liquidity costs precisely may present challenges where secondary trading activity is thin and transparency poor. Moreover, evidence suggests that without guidance or requirements from authorities, fund managers may implement swing pricing inadequately or may not use it, so authorities may need to impose certain requirements to ensure that swing pricing is effective.[33]

This option would also reduce redemption pressures on MMFs in case of an aggregate shock to the demand for liquidity because fund managers would be able to increase the cost of MMF liquidity to be more in line with other sources. However, these costs may not be sufficient to dissuade investors from redeeming in a liquidity shock where cash needs are primary. The effect on MMF redemptions would be greater if swing pricing leads investors to diversify their sources of liquidity ex ante.

By reducing the risk of large redemptions and potential asset fire sales, swing pricing (or economically equivalent measures) would benefit investors who care primarily about a fund's safety and yield. At the same time, it may discourage the use of MMFs by investors who have a low tolerance for risk of losses upon redemption. Swing pricing may not be compatible with features some MMFs offer, such as same-day settlement and multiple NAV strikes per day (other related alternatives, such as anti-dilution levies, could allow for continued same-day settlement). The long-run effect of swing pricing on the demand for MMFs is ambiguous and would depend in part on the preferences of these investors.

In theory, swing pricing could also improve the stability and resilience of STFMs by reducing the transmission of shocks from MMFs to the underlying markets, since MMFs would be able to reflect market conditions when honouring redemption requests.

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[33] Some evidence about the usefulness of swing pricing in open-ended funds is available in academic and official sector papers. See ESMA's *Recommendation of the European Systemic Risk Board (ESRB) on liquidity risk in investment funds* (November 2020); the BoE and FCA's report on *Liquidity management in UK open-ended funds* (March 2021); and Jin et al., *Swing pricing and fragility in open-end mutual funds*, The Review of Financial Studies (2021).

The broader implications of swing pricing for STFMs – beyond the direct effects on MMF vulnerabilities – are uncertain. Its effects on the size of the MMF industry depend in part on the preferences of current MMF investors (as noted above) and those of fund managers/sponsors, who may decide that implementation of this tool is too costly and therefore exit the non-public debt MMF sector. To the extent that swing pricing reduces demand for non-public debt MMFs, it would likely do so by diminishing their attractiveness for cash management by imposing liquidity costs on redeeming MMF investors in stress events (although investors may still prefer this approach to the possibility of gates that prevent redemptions altogether). This would likely contribute to growth in cash management alternatives, potentially bank deposits and public debt MMFs in jurisdictions where they are available. On balance, these shifts would enhance financial stability, although funding sources for borrowers would become less diverse and more costly.

Other variants and options: Swing pricing (or economically equivalent measures) may not be effective if fund managers are reluctant to use it because of the stigma associated with doing so, as may have been the case in some jurisdictions where it is already available. Swing pricing also may be ineffective if the swing factor is too small and does not transfer all the cost of redemptions to redeeming investors, or if the option to use swing pricing is not used at all.[34] To mitigate this risk, authorities could mandate the use of this tool, including specifying minimum parameters (for the swing factor or anti-dilution levy) to limit the discretion of fund managers in case of a systemic crisis. To avoid cliff effects, authorities could increase those parameters based on money market conditions. However, authorities may find it challenging to determine the costs redeeming investors impose on the fund and set the appropriate minimum size of the swing factor. There is also a risk that investors anticipate changes in parameters by authorities and redeem pre-emptively, which could have broader effects than actions undertaken by individual funds.

4.3.1.2 Absorb losses

Vulnerabilities addressed: MMFs' susceptibility to sudden and disruptive redemptions arises in part because they are exposed to credit and liquidity risk, which can cause investors to abruptly lose confidence in MMFs' ability to maintain principal stability. Thresholds associated with stable NAVs may exacerbate incentives to redeem if the risk of losses becomes salient. Even for a VNAV fund, it may be difficult to accurately determine the value of assets during stress events when asset prices are volatile and liquidity conditions are deteriorating, which could motivate redemptions to the extent that investors believe the value of the fund's assets is lower than its NAV. These dynamics can create a first-mover advantage for redeeming investors.

Representative Option: minimum balance at risk

Description: In a fund with a minimum balance at risk (MBR), a small fraction of each investor's shares ("MBR shares") cannot be redeemed immediately. All other shares could be redeemed without constraint, so most redemptions would be unaffected by the MBR; that is, as long as the investor's position in the fund exceeds her MBR, her redemptions are paid out without delay. An

[34] See the BoE and FCA's report on *Liquidity management in UK open-ended funds* (March 2021) for details. In the US, open-end mutual funds have the option to use swing pricing but do not do so.

MBR reduces slightly the quantity of liquidity available to redeeming investors if they wish to withdraw a substantial portion of their money.

The MBR can reduce the risk that investors remaining in a fund would have to disproportionally bear losses and thus reduce their incentive to redeem. The MBR does this by creating a trade-off between liquidity and principal preservation.

In some rare, pre-defined events, such as a material loss to the fund occurring over a short period of time or an adverse event that leads to a fund's liquidation, the loss would be absorbed by the MBR shares. Moreover, each investor's MBR shares would be subordinated (to absorb losses first) in proportion to that investor's recent redemptions. As a result, redeeming investors would be more likely to absorb losses than investors remaining in the fund.

Assessment: The MBR could materially reduce the first mover advantage from potential losses in a MMF because investors remaining in that fund would no longer bear losses disproportionally. Investors would face a trade-off between obtaining liquidity by redeeming their shares, which increases the likelihood that they bear losses in a stress event, and preserving principal by remaining in the fund. The trade-off between liquidity and capital preservation would make funds with an MBR more resilient to shocks that affect the value of the assets held by MMFs.

The MBR would raise the cost of redemptions by putting redeeming investors' MBR shares at greater risk, reduce the vulnerability of MMFs to runs driven by credit concerns, and may provide for a fairer distribution of losses among investors. However, it would be unlikely to prevent large redemptions due to an aggregate increase in the demand for liquidity.

The MBR's novelty may result in investor confusion or unease, particularly when it is first introduced, which may reduce demand for MMFs, at least for a time, and cause investors to move to other products. The long-run effect on the size of the industry will depend in part on the preferences of current MMF investors with respect to liquidity, principal stability, and yield. The effect on accounting treatment requires further exploration, particularly as it may play an important role in whether investors continue to use MMFs as a cash management tool.[35] Finally, establishing parameters for the MBR could present challenges, and the effectiveness of this option could be diminished if parameters are not set appropriately.

From the perspective of MMF managers/sponsors and intermediaries, significant operational adjustments may be needed for systems to: (1) compute the MBR on an ongoing basis for each shareholder account and update the allocation of unrestricted, MBR, and subordinated MBR shares for each account to reflect additional purchases or redemptions and the passage of time; and (2) prevent a shareholder from redeeming MBR shares in transaction processing systems. In some jurisdictions, subordinating MBR shares to other shares in the fund may create the need to convert existing MMF shares or issue new subordinated shares because of restrictions on allocating losses to a subset of shares in a single class. This could lead to some fund managers/sponsors exiting the MMF business, which could reduce overall MMF participation in STFMs or concentrate that participation among fewer MMF managers.

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[35] Some of the policy options in this section may impact guidance and interpretation of the accounting standards that define under which conditions MMFs can be considered "cash equivalent".

Regarding the broader implications of the MBR for STFMs – beyond its direct effects on MMF vulnerabilities – to the extent that the MBR reduces demand for non-public debt MMFs, it would likely do so by diminishing their attractiveness for cash management by making MMF shares less liquid. This would contribute to growth in cash management alternatives, potentially bank deposits and public debt MMFs (in jurisdictions where they are available). On balance, these shifts would enhance financial stability, although funding sources for borrowers would become less diverse and more costly.

Representative Option: capital buffer

Description: An alternative way to protect MMF investors from losses would be to require MMFs to maintain a capital buffer. In some rare, pre-defined events, such as a material loss to the fund occurring over a short period of time, the loss would be absorbed by the capital buffer, thereby protecting the fund's NAV. Rather than a liability of the fund, capital buffers could be held outside the MMF in an escrow account financed by fund managers or by outside investors (e.g. the sponsor), who would need to be compensated for the attendant risk.

Assessment: A capital buffer of sufficient size would mitigate the risk of losses being borne by investors, and thus reduce their incentives to rush to redeem because of fears of potential losses in the fund, especially those stemming from credit concerns in stress situations. A capital buffer would not mitigate incentives to redeem or inhibit large redemptions that stem from an aggregate increase in the demand for liquidity. Buffer size is important, as concerns that a buffer is too small to absorb potential losses could trigger pre-emptive redemptions by investors who wish to exit the fund before the buffer is depleted.

Capital buffers would make it costlier to operate MMFs, which could lead to closure of MMFs and greater industry concentration. The costs of financing a buffer should vary with the likelihood that it will be tapped, so financing costs would be higher for funds that take on more risk, which could mitigate fund managers' incentives for risk-taking. However, if a fund manager finances the buffer, the manager may have incentives to invest in riskier assets that generate a higher return. On balance, funds would likely be safer but have lower yields.

Calibrating the size of the capital buffer for a MMF and defining the events in which it would absorb losses could present challenges, and the effectiveness of this option could be diminished if parameters are not set appropriately.

A capital buffer is likely to improve the stability and resilience of STFMs by reducing the vulnerability of MMFs to runs mainly due to credit concerns in stress situations.

Regarding the broader implications of a capital buffer for STFMs – beyond its direct effects on MMF vulnerabilities – because the cost of providing such a buffer is likely to reduce net yields of MMFs, a capital buffer may reduce demand for MMFs among yield-sensitive investors and cause growth in potential MMF substitutes, especially those that pay higher yields. This could contribute to growth in investment-like alternatives, such as short-term bond funds and similar products and – for large investors – direct investment in money market instruments. Growth in these substitutes at the expense of non-public debt MMFs would have varying net effects on financial stability, as short-term bond funds present roughly similar risks while direct investing carries somewhat lower risks to financial stability. For borrowers, funding currently received from MMFs

would likely shift to coming from banks, short-term bond funds, or other types of asset management firms and could become more expensive.

Other variants and options: One variant is permitting MMF sponsors to provide financial support to their MMFs, which could involve support to absorb losses or provide liquidity. Historically, in certain jurisdictions, some MMFs have benefited from sponsor support to absorb losses that otherwise would have been borne by investors or to provide liquidity to the fund. However, in contrast to capital buffers that represent resources set aside in advance of a period of stress, sponsor support is generally discretionary and the decision to support a fund happens after the shock occurs. This creates the risk that the sponsor cannot (or chooses not to) support a fund, potentially upsetting investor expectations and generating further stress, as occurred in the case of the Reserve Primary Fund in the US in 2008. Another risk is that a sponsor may weaken its financial position by supporting its MMFs, potentially making the sponsor unable to withstand a protracted or later shock and leading to contagion effects.[36] Moreover, these linkages between MMFs and sponsors – which are nominally separate entities – potentially increase interconnectedness for MMFs and other financial institutions.[37] Allowing sponsor support might favour MMFs with sponsors that are affiliated with banks or other financial institutions and lead to an increase in industry concentration.[38] For these reasons, sponsor support for MMFs was explicitly forbidden by the MMF Regulation that currently applies in the EU and UK.

External liquidity support is another variant, where an institution would stand ready to purchase assets from MMFs to provide liquidity during stress periods. Therefore, when large redemptions occur, it would be easier for funds to meet redemptions. One option would be to set up a liquidity exchange bank (LEB). An LEB would be a commercial bank, funded by MMFs or other MMF stakeholders, which would stand ready to acquire eligible assets from MMFs during stress periods. Such a bank would be designed solely to provide liquidity, not credit support, for MMFs. That said, the business model of an LEB is untested. If it relies on access to central bank support as part of its business model, the LEB would give rise to concerns that it formalises central bank backstops and institutionalises moral hazard.

4.3.1.3 Reduce threshold effects

Vulnerabilities addressed: Regulatory thresholds may cause investors to pre-emptively redeem to avoid the consequences of a fund's crossing those thresholds. For certain MMFs in some jurisdictions, declining liquid assets may motivate redemptions, because if such assets fall below specified thresholds, MMFs may be able (or required) to impose a fee or gate on redemptions. In addition, for funds that maintain stable NAVs, declines in the value of the fund's underlying assets per share may incentivise redemptions, because if the value falls below a

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36 McCabe, *The cross section of money market fund risk and financial crises*, Finance and Economics Discussion Series 2010-51. Board of Governors of the Federal Reserve System, (2010) shows that during the 2008 financial crisis, MMFs with weaker sponsors experienced higher outflows than other MMFs. Bengtsson, *Shadow banking and financial stability: European money market funds in the global financial crisis* (2013) documents how sponsor support contributed to contagion from MMFs to banks.

37 See FSOC *Proposed recommendations regarding money market mutual fund reforms* (2012).

38 Baba et al. in *US Dollar Money Market Funds and Non-US Banks*, BIS Quarterly Review (March 2009), indicate that among sponsors that provided support to MMFs in 2007-2008, most of them belonged to a banking group. In 2020, there were only two cases of direct sponsor support to MMFs in the US; the two cases were related to sponsors belonging to a banking group.

threshold, the fund may have to change the valuation approach away from the stable NAV and reprice its shares.

Representative Option: removal of ties between regulatory thresholds and imposition of fees and gates

Description: For some MMFs (such as prime MMFs in the US and CNAV and LVNAVs in the EU), once regulatory thresholds related to liquidity (e.g. to weekly liquid assets (WLA)) are breached, the fund's board can consider imposing fees and gates.[39]

This option would decouple the potential use of fees and gates from regulatory thresholds in MMFs that currently have such a tie. Its primary objective is to reduce the likelihood of destabilising redemptions, by reducing the first mover advantage related to WLA thresholds and the overall focus on these thresholds. These types of MMFs would be able to activate fees and gates irrespective of their liquidity levels. The focal points related to required WLA levels might still apply, but they would no longer be directly related to the potential activation of liquidity management tools such as fees and gates.

Assessment: This option would reduce the likelihood of pre-emptive runs by investors in MMFs that can impose fees and gates. In addition, this may make fund managers more willing to use their WLA buffers to meet redemptions, thus reducing the need to sell less liquid assets.[40] Otherwise, this option would not significantly affect the MMF industry, and hence shifts to alternative products would likely be limited.

However, since this option would not address other sources of MMFs vulnerabilities, including the use of MMFs for cash management, the funds' performance of liquidity transformation, and their exposure to credit risks, funds would still be susceptible to large redemptions in times of liquidity stress. Indeed, the events of March 2020 have shown that some MMFs, such as European VNAV MMFs, that were not subject to fees and gates experienced high outflows, suggesting that this option on its own would not be sufficient to mitigate all vulnerabilities stemming from the operations of MMFs.

Such a reform could increase uncertainty for investors regarding the use of fees and gates by the fund,[41] and MMFs might be reluctant to use them due to stigma effects and possible contagion to other funds from the same family. In addition, the use of fees or gates by one MMF

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39 The link between the breach of regulatory thresholds and the consideration of fees and gates by MMFs is present in some jurisdictions, but not all. In the US, for prime MMFs, a fund's board can impose fees and gates if a fund's WLA drops below the 30% requirement, and when WLA falls below 10%, the fund must impose a 1% fee on all redemptions unless the fund's board determines that such a fee is not in the best interest of the fund or that a lower or higher fee is more appropriate. In the EU, for public debt CNAVs and LVNAVs, fees and gates are to be considered when the fund's WLA falls below the 30% requirement *and* daily outflows exceed 10%, whereas full gating (suspension) of redemptions or fees become mandatory once WLA falls below 10%. In addition, in the EU, MMFs can impose partial gates, but in the US only full gates (suspension of redemptions) are possible.

40 Capota et al. in *How effective is the EU Money Market Fund Regulation? Lessons from the COVID-19 turmoil* (2021) find that although LVNAVs had higher outflows than other MMFs, they made less use of their liquid assets to meet redemptions, indicating possible reluctance to use the liquidity buffers.

41 See SEC *Money Market Fund Reform; Amendments to Form PF, Investment Company Act Release No. 31166* (Jul. 23, 2014) [79 FR 47736 (Aug. 14, 2014)] at text accompanying nn.227-229 ("[A] group of commenters expressed concern about giving money market fund boards discretion to impose fees and gates. For example, some commenters noted that board discretion could create uncertainty among investors, and that boards might be reticent, due to the possible impact of the decision, to act in a time of crisis."). Similarly, in the EU in response to the 2012 Consultation, some asset managers proposed to base the activation of fees on objective triggers such as WLAs.

could have spillover effects on other (unrelated) MMFs if investors expect those funds to face similar liquidity issues.

As the option would mean investors would be less likely to redeem as the MMF approaches its threshold, MMF managers/sponsors may be more willing to use their internal liquidity provisions rather than seek to maintain high liquidity thresholds to prevent further redemptions.

Regarding the broader implications of this option for STFMs – beyond its direct effects on MMF vulnerabilities – because this option would not significantly affect supply or demand for MMFs, it is unlikely to cause significant shifts to potential MMF substitutes. On the contrary, mitigation of potential threshold effects could attract some money away from some less vulnerable cash management alternatives, potentially government MMFs. Resulting effects on financial stability are likely to be modest. Similarly, this option's impact on borrowers would likely be small.

Other variants and options: This option is directly related to a variant where the link between the breach of regulatory thresholds and the consideration of fees and gates would remain, but MMFs would need permission from authorities before activating such tools. This variant would be less effective than the representative option since investors would still have incentive to redeem pre-emptively as focal points would still be associated with the possible imposition of fees and gates. In addition, requiring permission from authorities could add further uncertainty regarding the activation of fees and gates and create operational and reputational risks for authorities. Finally, it would take additional time to complete any action, which is not desirable under stress, especially if authorities are not likely to deny managers' requests. Another variant is to introduce a transition period during which a fund that breached the buffer requirement would have to increase its liquid assets to reach a temporarily higher requirement.

Another variant with a broader scope involves setting up countercyclical liquidity buffers, which would result in a lower liquidity buffer requirement during times of stress. This could apply to all types of funds, including those not currently subject to fee and gate requirements. This option could provide additional flexibility to MMFs to use liquidity buffers to meet redemptions. Moreover, if fees and gates are tied to liquidity thresholds, a countercyclical buffer may alleviate investors' concerns about the possible imposition of fees or gates, which could reduce the likelihood of pre-emptive runs. On the other hand, if thresholds remain, they could continue to be monitored for pre-emptive runs by institutional investors. During stress periods, authorities would lower required liquidity levels, giving MMFs more leeway to sell liquid assets to meet redemptions and reducing pro-cyclical sales of less liquid assets in markets. If new countercyclical liquidity buffers were added to the existing liquidity buffers in a way that increases the overall liquidity buffer during normal times, liquidity transformation by MMFs in normal times would also be reduced. Designing an effective countercyclical liquidity buffer could have challenges and, if activating the countercyclical requirement necessitates action by authorities in times of stress, this could create operational and reputational risk for authorities. As above, this would also take time, which is not desirable under stress. Further, activation of the countercyclical provision could lead to investor concerns about the liquidity of an MMF and contribute to redemption incentives.

Another possible threshold effect could arise when a few very large redemptions can cause significant stress to a fund and lead to a potential suspension of redemptions or the imposition of fees. In jurisdictions where this is a concern, imposing investor concentration limits could reduce the risk that redemptions from a single large investor might trigger distress in a particular

MMF. Individual investors would be subject to a limit on the percentage of shares they can hold in one fund. The implementation of this option could raise operational challenges for asset managers who must access data on investors' shares in a timely and granular manner and manage passive breach limits. This option could also lead to higher correlation/contagion between MMFs with similar investor bases, where investors could liquidate positions across many funds simultaneously.

Representative Option: removal of stable NAV

Description: Removing the stable NAV, and requiring funds to have a variable NAV, can reduce investors' incentives to redeem when they believe that the underlying value of the assets in the fund's portfolio has fallen below the stable NAV and is at risk of falling below a threshold at which the fund must change its valuation approach and reprice its shares.

Assessment: Removing the stable NAV would reduce the first mover advantage, as redemptions at a stable NAV would no longer be possible when underlying assets are worth less. Liquidity and credit risks associated with the MMF's portfolio assets would be better reflected, through changes in NAV to match fluctuations in the mark-to-market value of the assets. Nevertheless, the March 2020 episode showed that VNAV funds can also experience large redemptions, as exemplified by outflows from French VNAV funds. Moreover, it may still be difficult for variable NAV funds to accurately determine the value of their assets during stress events when asset prices are volatile and liquidity conditions are deteriorating.[42] Additionally, a variable NAV does not eliminate the possibility that redeeming investors impose liquidity costs on remaining investors, so a form of first mover advantage would remain.

Regarding the broader implications of removing the stable NAV for STFMs – beyond its direct effects on MMF vulnerabilities – because this option would diminish the cash-like features of MMFs, it would likely reduce demand for funds that have to adopt a VNAV and contribute to growth in cash management alternatives, potentially bank deposits and public debt MMFs (in jurisdictions where they are available). On balance, these shifts would enhance financial stability, although funding sources for borrowers would become less diverse and more costly.

4.3.2. Mechanisms to mitigate the impact of large redemptions

This sub-section focuses on mechanisms aimed at mitigating the impact of large redemptions by reducing MMF liquidity transformation.

4.3.2.1 Reduce liquidity transformation

Vulnerabilities addressed: MMFs perform liquidity transformation, as the redemption terms of their shares are not matched by the liquidity of some of the assets they hold. Because MMF shares can be redeemed daily or even intraday at no or limited cost, liquidating MMF shares may be easier than selling other assets that some MMF investors may hold (such as direct investments in money market instruments), and when market liquidity becomes scarce and

[42] See, for example, Hanson et al, *An Evaluation of Money Market Fund Reform Proposals*, IMF Economic Review (2015).

costly, incentives to redeem increase. Liquidity transformation also can contribute to a first-mover advantage for redeeming investors in a stress event.

Representative Option: limits on eligible assets

Description: This option would limit eligible assets for MMFs and require them to invest a higher portion of their assets in shorter dated and/or more liquid instruments. This would lower MMFs' exposures to less liquid assets such as CP and CD. Therefore, it would be easier for funds to meet large redemptions with the proceeds from maturing assets or by disposing of assets without a material price impact.

Assessment: This option would mitigate the impact of large redemptions by reducing the liquidity transformation performed by MMFs, making them less dependent on liquidity conditions in the markets for the assets they hold, and reducing the first-mover advantage for redeeming investors. Outflows related to liquidity concerns would be more limited, but large redemptions would still be possible during stress times, for example if there is an aggregate shock to the demand for liquidity, as was the case in March 2020. Nevertheless, since MMFs would be in a better position to meet large redemptions without a significant price impact, the risk of serious strains on funds during periods of stress would be lower. The extent of these benefits would depend on the level of reduction in liquidity mismatch in MMFs resulting from this option.

While this option would reduce MMF liquidity transformation, considerations about its additional net benefits on other parts of the financial system are also important. The option would reduce the transmission and the contribution of shocks from MMFs to the underlying markets, thus preserving financial stability. Nevertheless, benefits in a broader context, for CP/CD issuers' capacity to find other investors for example, are less clear. A requirement that MMFs invest in assets with shorter tenors could incentivise issuance at shorter maturities, which in turn could increase rollover risk for issuers, particularly those that are not subject to stringent regulations governing funding liquidity. In this scenario, some liquidity risks would be shifted from MMFs to issuers. On the other hand, as MMFs potentially become a more stable funding source, the rollover risk for the issuers would be reduced. A limit to eligibility could also simply mean reducing the share of AUM concentrated in less liquid assets, which could lead to better management of funding risk from issuers, and less concentrated reliance on MMFs.

Because this option would diminish the yields offered to investors, it may result in a modest shift to other investment-like alternatives, such as short-term bond funds and similar products and – for some institutional investors – direct investment in money market instruments. Growth in these substitutes at the expense of non-public debt MMFs would have varying net effects on financial stability, as short-term bond funds present roughly similar risks while direct investing carries somewhat lower risks to financial stability. For borrowers, funding currently received from MMFs would likely shift to banks and short-term bond funds, and hence become more expensive.

***Other variants and options*:** Another option would be to constrain MMFs to hold public debt instruments only, which would effectively restrict MMFs to government MMFs. Relative to the representative option, this would further bolster the resilience of MMFs, since their assets would be even more liquid, provided that government securities continue to have low credit and liquidity risks. At the same time, the impact on investors and on STFMs would also be greater, as MMF participation in (private) STFMs would be eliminated, except perhaps through repo markets.

Another variant consists in setting each MMF's required liquidity buffer based on its own characteristics, such as its investor base (MMFs sold to institutional investors might be subject to higher liquidity requirements) or the outcome of its fund-specific stress tests. These variants would reduce liquidity transformation performed by MMFs. Implementing this variant likely would require authorities to impose additional reporting requirements on MMFs to determine the appropriate size of their buffers.

An alternative set of variants aims to reduce liquidity transformation by changing the terms for redemptions of MMF shares rather than increasing the liquidity of their assets. For example, liquidity-based redemption deferrals would allow only a fraction of each redemption request to be met on the same day. This fraction would depend on the share of daily liquid assets held by the fund. This would effectively divide investors' claims into two tiers, a liquid portion of each share that is redeemable daily and a less-liquid portion that is only available with a delay. Non-daily dealing or increased notice periods are variants of this proposal, where MMFs only offer redemptions at longer frequencies. Redemptions in-kind are another option that would expose investors to the risk of receiving less liquid money market instruments instead of cash. Relative to the representative option, these three variants would make MMFs less cash-like, which could result in more significant shifts by investors towards alternative products, especially those with cash-like features.

Representative Option: additional liquidity requirements and escalation procedures

Description: This option would subject MMFs to additional liquidity requirements by mandating that they hold minimum amounts of assets that can be readily converted to cash over a 2-week horizon or less. In addition, the use of liquidity management tools would be structured around escalation procedures when regulatory thresholds are breached. In such circumstances, MMFs would be required to use price-based tools such as liquidity fees or swing pricing first, then quantity-based tools (notice or settlement periods), before finally being able to use gates.[43]

Assessment: This option would make MMFs more liquid on the asset side through the additional liquidity requirements and provide more flexibility in terms of liquidity management tools. The likelihood of pre-emptive runs by investors due to concerns about the use of gates could be reduced, since MMFs would first have to use other tools. While liquidity management would be improved at the fund-level, the use of liquidity management tools could still produce stigma effects with possible spillover to funds seen as similar. Similarly, regulatory thresholds would remain focal points for investors creating risks of cliff effects. This option would be unlikely to change the demand for MMFs substantially. MMFs would be more liquid as they would invest more in short-dated and more liquid instruments.

The broader impacts of this option on financial stability likely would be similar to those of limits on eligible assets. This option would probably result in additional issuance of short-dated money market instruments and hence some increased rollover risk for issuers. It is also likely to lead to some modest growth in investment-like alternatives, with mixed effects on overall resilience.

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[43] Instead, escalation procedures can be considered a variation of the option that would decouple fees and gates from the breach of regulatory thresholds.

5. Adopting complementary measures on risk monitoring and short-term funding markets

Policies aimed at enhancing the resilience of MMFs could be accompanied by additional reforms in two areas. The first involves policies that make it easier for fund managers to manage their risks and for authorities to monitor them, while the second involves measures that aim at improving the functioning of the underlying markets.

Within the first area, two sets of policies can contribute to robust risk management by fund managers and risk monitoring by authorities: stress testing (including the use of common scenarios) and transparency requirements for STFMs and other participants within these markets (see Box 5). While these policies will not directly address MMF vulnerabilities, they can support the monitoring of those vulnerabilities and inform regulatory and supervisory action.

Stress tests can be used by MMF sponsors and authorities to identify vulnerabilities in individual MMFs and for the sector as a whole. Reverse stress tests could also be considered to define tipping points at which MMFs would be unable to perform their functions. Once identified, those vulnerabilities could be addressed by remedial actions at the fund or sector-wide levels.

Transparency requirements may include public disclosures and regulatory reporting. The former can help market participants understand and assess risks related to MMFs and the underlying markets in which they invest. By closing data gaps, transparency measures can foster price discovery, mitigate any information asymmetries and anchor investor expectations regarding secondary market liquidity, including during stress periods. They can also support specific policy options for MMFs (e.g. swing pricing, additional requirements on the level and composition of liquidity buffers, or investor concentration limits). The latter can help authorities to assess market dynamics and to obtain a broader perspective on STFMs and interconnectedness with MMFs.

Box 5: Policies to enhance risk identification and monitoring

Fund-level stress tests. While stress test requirements form part of the IOSCO Recommendations and already exist in several jurisdictions, they could be reinforced across a range of dimensions. These include defining a minimum set of common scenarios to be used by all MMFs (e.g. based on experiences such as in March 2020); conducting more frequent or ad hoc tests depending on market conditions; or introducing reverse stress tests. The latter types of tests would aim at identifying market conditions that would make MMFs unable to perform their functions to investors and/or comply with regulatory requirements. The results of the fund-level stress tests along with any remedial actions would be discussed by the MMF board and be reported on a regular basis to the relevant authorities.

Sector-wide stress tests. Sector-wide stress tests could complement individual fund-level stress tests by ensuring that potential coordination failures among MMFs (i.e. the inability of fund managers to incorporate the behaviour of other funds in their own stress tests) could be identified. Authorities would assess MMF resilience to common shocks by analysing the ability of underlying markets to absorb the sales. This would allow authorities to identify common vulnerabilities across MMFs (such as common exposures to assets with low liquidity) and the markets they invest in. Reverse stress tests could also be included to identify tipping points at which MMFs would be unable to function properly. Those tipping points could then be compared to scenarios or historical episodes to assess the resilience of the MMF sector. The findings from both types of stress tests would provide useful input for authorities to consider remedial actions at a sector-wide level (through regulatory policy measures) and/or at fund-level for MMFs most exposed to those vulnerabilities (through supervisory measures).

Additional MMF reporting requirements to authorities. MMFs are already subject to a range of reporting and disclosure requirements. However, the frequency of reporting may need to be increased in certain cases (e.g. from quarterly to monthly), with some metrics possibly reported even more frequently (e.g. flows, adherence to liquidity requirements) to enhance the ability of authorities to monitor risks relating to the role of MMFs as cash management vehicles. In addition, a minimum level of harmonisation of reporting requirements could foster comparability of MMFs across jurisdictions. Additional reporting by MMFs on liquidity ratios and their investor base, as already required in some jurisdictions, could support the identification of risks related to investor behaviour (e.g. retail vs institutional investors, corporates vs financial institutions) and to concentration of ownership.

Disclosure and reporting requirements on STFMs. The lack of granular data on (particularly) CP and CD markets makes it difficult to monitor market conditions and assess the ability of those markets to absorb different volumes of sales. Although reporting frameworks for MMFs are uneven across jurisdictions, MMFs are generally subject to reporting requirements. Other investors in money market instruments (notably those with direct holdings) as well as issuers and/or dealers are not typically subject to such requirements. These participants could report data on primary markets (e.g. volume and yield at issuance, and outstanding amount by type of issuer, rating and maturity), secondary markets (volumes and prices), dealer inventories and holdings by investor type. Such data would be made available to authorities and part of it (in aggregate format and with an appropriate delay) could be disclosed to the public as is already done in some jurisdictions (e.g. France and the US for the primary CP market). Enhancing transparency could foster more competition among market participants and diversify the investor base by attracting other types of investors, which could increase liquidity in these markets. In addition, the availability of such data would make the stress tests of MMFs more meaningful. Such reforms could support certain policy options to enhance MMF resilience (e.g. swing pricing or the levels and composition of liquidity buffers), as data on market activity could inform the calibration of such measures. The information collected may also prove useful in assessing issuers' dependency on MMFs for their short-term funding needs.

The second area involves measures that aim at improving the functioning of the underlying markets. The structure of the CP and CD markets makes them susceptible to illiquidity in times of stress. This highlights the need for policy reforms to enhance MMFs' own resilience, as those funds cannot rely on liquidity in these markets to raise cash to meet redemptions in stress. At the same time, even in jurisdictions where MMFs are large investors in CP and CDs, MMF reforms by themselves will not likely solve the structural fragilities in STFMs. Authorities might therefore consider adopting measures to improve the functioning of CP and CD markets. While useful in their own right, it is not clear that such measures would change the limited incentives of market participants to trade or of dealers to intermediate, particularly during stress periods.

Box 6: Potential measures to improve the functioning of CP and CD markets

The structure of CP and CD markets makes them susceptible to illiquidity in times of stress. Given the short-term nature of the instruments, investors (including MMFs) tend to hold them until they mature rather than sell in the secondary market. Dealers provide little secondary market intermediation in normal times and thus are unlikely to intermediate large flows during stress periods. The March 2020 turmoil revealed different expectations between investors about the role of dealers in providing liquidity in these markets in stress.

Some market participants[44] have suggested other measures that can be considered to improve the functioning of CP and CD markets:

- Changes in the microstructure – such as increased standardisation of the underlying instruments, faster settlements, paperless processes, electronic all-to-all trading platforms – may reduce the need for dealer intermediation and improve the interactions between issuers and end-investors.
- Increased market transparency in terms of volumes, prices and quotes may attract a broader range of participants.
- Enhanced regulatory reporting may enhance the ability of authorities to monitor trends and risks across the entire spectrum of CP/CD investors, rather than just MMFs (see also Box 5).

These measures seek to improve efficiency, expand access, increase competition, and enhance the ability of the authorities to monitor developments. They may also help MMFs and other market participants to identify better investment opportunities and reduce their reliance on individual dealers. The measures will need time to design and implement given the different structure of CP and CD markets across jurisdictions and the fact that some of these measures may involve changes in private conventions or contracts. However, it is not clear that such measures would alter the characteristics of these markets that give rise to illiquidity during stress times.

6. Considerations in selecting policies

Building on the assessment in section 4, two sets of common considerations are relevant for jurisdictions when selecting MMF policy measures. The first relates to the question of how to *prioritise* representative options (or their variants) given identified vulnerabilities, existing domestic MMF and STFM structures, and regulatory frameworks. The second set of considerations is how to *combine* policy options into a reform package that enhances resilience by addressing all identified MMF vulnerabilities. As with prioritising individual options, the optimal combination of policy measures should take account of jurisdiction-specific circumstances and policy priorities, as well as cross-border considerations including to prevent regulatory arbitrage and spillovers that could arise from adopting divergent approaches across jurisdictions.

6.1. Prioritising MMF policy options

The main objective of the policy proposals in this report is to enhance MMF resilience, including with respect to the appropriate structure of the sector and of underlying STFMs. Enhancing MMF resilience will promote financial stability and thus minimise the need for future extraordinary central bank interventions to support the sector. When prioritising individual policy options, it will therefore be important for jurisdictions to consider the vulnerabilities prevalent in domestic MMFs and any associated cross-sectoral and cross-border linkages, and to assess how the options would address those vulnerabilities and enhance system-wide resilience.

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44 See, for instance, Association Française de la Gestion financière, Highlights regarding French MMFs during the COVID-19 crisis (November 2020); Blackrock, *Lessons from COVID-19: U.S. short-term money markets* (July 2020) and *Lessons from COVID-19: the experience of European MMFs in short-term markets* (July 2020); Official Monetary and Financial Institutions Forum, *The future of money market funds* (June 2021); and EFAMA, *European MMFs in the Covid-19 market turmoil: Evidence, experience and tentative considerations around eventual future reforms* (November 2020).

At a high level, some options aim to reduce the likelihood of destabilising redemptions occurring, while others aim to mitigate the impact of large redemptions. The assessment of representative options in section 4 focuses on addressing MMF vulnerabilities through different mechanisms: transferring the cost of liquidity to redeeming investors; loss absorption; removing threshold effects; and reducing liquidity transformation. In some cases, a particular option may mitigate vulnerabilities through more than one of these mechanisms.

Selected policy options should operate through those mechanisms that are deemed most effective in addressing jurisdiction-specific MMF vulnerabilities (which may differ across fund types). Important factors to consider in this respect will be existing regulations, the size and structure of the local MMF sector, and the use of MMFs by different types of investors (e.g. retail versus institutional) and borrowers (e.g. financial versus non-financial corporates, government versus non-government), as well as the functioning of STFMs. These factors will affect the need for and effectiveness of certain policy options across jurisdictions. For example, MMFs used by institutional investors to manage liquidity may be more susceptible to runs than those used by retail investors, which could imply that policy measures need to be stronger in the former than the latter. Similarly, MMFs invested mainly in non-government instruments have higher exposure to potential credit losses and may be more susceptible to destabilising redemptions (particularly if they are used for cash management purposes) and less able to mitigate their impact given the lack of liquidity of the underlying instruments. Currency denomination is another important consideration in jurisdictions with MMFs denominated in foreign currencies, given that this segment may be more sensitive to funding conditions outside those jurisdictions.

Moreover, the wider impact on the financial system will depend on how the reforms will affect the linkages between MMFs and other market participants, as well as by the types of alternatives for investors and borrowers in STFMs. For example, some policy options might cause a large-scale shift of investors or borrowers to MMF substitutes for their cash management or short-term financing needs. The types of substitutes and associated effects and risks of such a shift vary by jurisdiction. Some options may also have cross-border effects, to the extent that they impact foreign investors in domestic MMFs or domestic MMFs invested in foreign financial markets. Given these effects, authorities may wish to consider any cross-border impacts of their domestic MMF policy choices. And a few policy options (e.g. sponsor support) involve the transfer of risk to other market participants, which raises additional considerations for system-wide resilience. The assessment framework in Annex 2 provides more details on these factors to support a comprehensive analysis of the impact of individual options.

6.2. Combining MMF policy options

A single policy option on its own may not address all vulnerabilities described in section 3 in a particular jurisdiction. Accordingly, policymakers should consider a combination of options to address the vulnerabilities prevalent in their jurisdiction and deliver sufficient enhancements to MMF resilience. This sub-section discusses risk-based considerations that could guide policymakers in the selection of combinations, and illustrates how different policy packages can be chosen to work together in an effective manner.

A natural starting point is to consider *policy tools that authorities or MMFs have at their disposal, but have not used in practice*. These include, depending on the jurisdiction, liquidity management tools such as redemptions in kind, anti-dilution levies and swing pricing or even notice periods.

Authorities may wish to encourage MMFs to use those tools to address vulnerabilities in their jurisdiction and/or take steps to facilitate or remove operational barriers to their use.

In terms of introducing new policies, certain measures may be relatively *straightforward to implement and are broadly compatible* with all options. For instance, evidence suggests that the ties between regulatory liquidity thresholds and the potential imposition of fees and gates may have created adverse incentives that amplified redemption pressures in certain MMF types during the March 2020 turmoil. Eliminating those ties could thus reduce the likelihood of pre-emptive runs on MMFs. However, while this option would have broad applicability, it would only address some of the identified vulnerabilities for MMFs. In many jurisdictions, this option would be appropriate to combine with other policies to reduce the likelihood of destabilising redemptions in times of stress, even in the absence of any threshold effects.

The next step for potential combinations of policy options is to consider the *complementarity and compatibility* of options that address each of the specific vulnerabilities identified in a given jurisdiction. For each vulnerability, there are a number of options to enhance resilience based on the different mechanisms described above. Certain options tend to complement and reinforce each other, while others may be incompatible with each other. Authorities would then assess whether the combination of options forms a coherent package in addressing vulnerabilities, given the roles of MMFs in STFMs.

Options that complement each other might include, for example, those that involve different mechanisms to address vulnerabilities, such as measures to reduce liquidity transformation (e.g. limits on eligible assets), absorb losses (e.g. through a minimum balance at risk) and remove threshold effects (e.g. removal of ties between regulatory thresholds and imposition of fees/gates). Such a combination would seek to make MMFs more robust to both credit events (as was the case in 2008) and liquidity events (as was the case in 2020). Options that are incompatible may, for example, pull MMFs in different directions between making them more cash-like or investment-like (e.g. introducing features to support principal stability such as a capital buffer, versus removing the stable NAV; or adopting limits on eligible assets to make MMFs more liquid, versus moving away from daily dealing).

When deciding upon the most appropriate combination of options to address different MMF vulnerabilities, one possible consideration for authorities may be the *intended functions* of MMFs in the jurisdiction within the broader context of their role in STFMs:

- If the goal of enhancing resilience is to be achieved by making MMFs more cash-like (i.e. aiming at preservation of capital and liquidity for investors), then policies should focus on reducing both credit and liquidity risks on the asset side. For instance, policies to consider include introducing a capital buffer (to enhance NAV stability) and restricting eligible portfolio assets to shorter-dated, higher quality and more liquid instruments (to reduce credit risk and liquidity transformation). Such reforms could also be combined with other measures that help improve the usability of liquidity buffers, e.g. removal of ties between regulatory thresholds and imposition of fees/gates or lowering the minimum liquidity requirement during times of stress. While such options would facilitate the use of MMFs for cash management purposes by investors and make their provision of financing potentially more stable, they would limit those funds' ability to provide financing especially for riskier borrowers in STFMs.

- If the goal of enhancing resilience is to be achieved by making MMFs more investment-like (i.e. allowing greater price variability or changes in redemption terms in times of stress), then policies should ensure that risks and costs are borne equitably by investors. For instance, policies to consider in this case include requiring swing pricing (or anti-dilution levies) and removing the stable NAV. These options would enhance the ability of MMFs to provide financing to riskier borrowers in STFMs, but could make those funds somewhat less appealing as cash management vehicles for investors who do not want to bear any principal losses, even in stressed market conditions.[45]

These choices may have implications on the current functions and business models of MMFs, as they could lead their investors and borrowers to shift to other financial intermediaries and markets, including on a cross-border basis. This may, in certain cases, recreate some of the vulnerabilities associated with MMFs but in a different form, which is why the analysis of potential substitutes to MMFs is a key consideration. Irrespective of the direction of change, authorities will need to ensure that the combination of options is coherent in its objectives and design.

[45] These funds may also be less likely to satisfy, in some jurisdictions, the guidance and interpretation of the accounting standards that define whether MMFs are "cash equivalent".

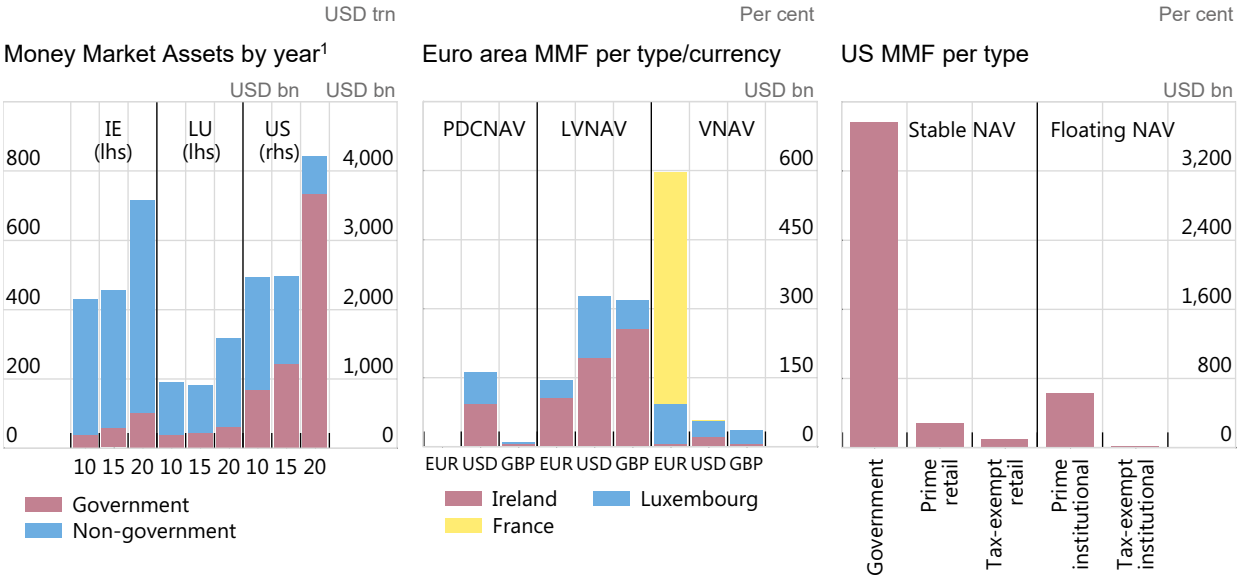
Annex A: MMFs and short-term funding markets

This Annex provides additional information on STFMs, MMFs and their functions within those markets, and the role that MMFs play for investors and borrowers.

STFMs and the role of MMFs

MMFs are important participants in STFMs. Table 2 in the main text examines the size of MMF investments in different STFMs segments of the STFMs compared to the overall size of those segments in several jurisdictions, as of the end of 2020. Figure A.A.1 presents additional details on the characteristics of MMFs in the US and EU in terms of currency denomination, the type of assets MMFs hold, and the nature of the principal stability they provide.

Characteristics of MMFs in US and the EU **Figure A.A.1**



[1] For Ireland and Luxembourg, figures include USD, EUR and GBP denominated funds. Data for the US exclude MMFs that are not offered to the public.

Sources: ICI; IIFA; iMoneyNet; FSB.

The role of MMFs in CP markets has varied considerably over time and across jurisdictions (see Figure A.A.2):

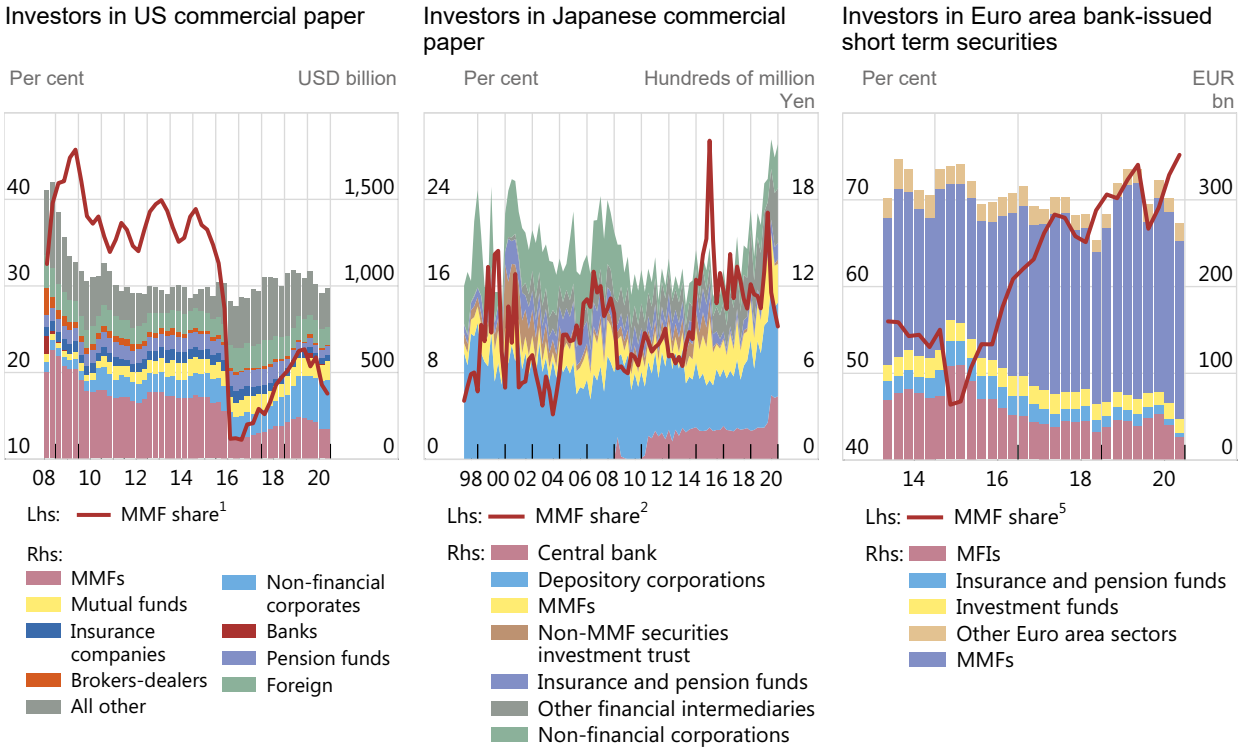
- At the end of 2008, USD-denominated CP outstanding totalled $1.6 trillion, and 40% of this was held by US MMFs. However, the size of the CP market fell sharply after the financial crisis, and by the end of 2012 the market was 40% smaller than it had been four years before. Since then, outstanding CP has remained at roughly $1 trillion. In addition, the importance of MMFs in the CP market has declined since the financial crisis, in part due to SEC reforms in 2014, and MMFs owned about 22% of CP outstanding at the end of 2020.

- In Japan, the size of the CP market increased by about two-thirds between 2010 and 2020, while investment by MMFs in this market segment remained relatively constant. This is notwithstanding the fact that since 2017, as a result of the Bank of Japan's

negative interest rate policy, “standard” MMFs do not exist as they are economically unviable. The only MMFs currently active in Japan are used by retail investors to place cash on a temporary basis in a trading account before it is invested somewhere else. At the end of 2020, MMFs owned about 13% of the CP issued in Japan.

- In the euro area, the overall amount of short term securities46 issued by euro area banks (a proxy for the size of the financial CP market), has been flat in the last eight years. However, euro-area MMFs play a much bigger role in the CP market than MMFs do in the US or Japan, as euro area MMFs own about 80% of financial CP, and their market share has increased in recent years. These MMFs also own almost 60% of non-financial CP outstanding.

Investors in commercial paper **Figure A.A.2**



1,2 Share of total held by MMFs.

Notes: the data for the Euro Area are from the ECB Securities Holding Statistics and only include paper issued by euro-area issuers and held by euro area holders.

Sources: ECB; Japan flow of funds accounts; US Financial Accounts; FSB calculation.

No comparable information is available to review the role of MMFs in CD markets over time.

Table A.A.1 shows estimates of MMF investments in different market segments. In Japan, MMF portfolios are mostly invested in deposits, but about a quarter is invested in CP. Japanese MMFs do not typically engage in repo activity and they do not invest in CDs or government paper. In the US and EU, the presence of government MMFs, which invest almost exclusively in sovereign and other government securities or repo collateralised with these securities, means that a large

46 Short-term securities include CP, CDs and other money market securities.

percentage of MMF assets are not invested in CP or CDs.[47] However, as the data for the US show, non-government MMFs invest a significant share of their assets in CP and CD.[48]

Table A.A.2 provides additional information on the investment portfolios of different types of MMFs in the EU. It highlights that CNAV funds have a role that resembles that of US government funds, and hence hold a substantial share of their portfolios in government securities. In addition, it shows that European MMFs have significant investments in USD-denominated CP.

Table A.A.1: MMF investments in different markets as a proportion of their portfolios in selected jurisdictions as of end-2020 (USD bn)

	US (all MMFs)	US (prime funds only)	Euro Area (only for domestic issuers and holders)*	UK**	Japan
Financial CP (including ABCP)	199	199	100	48	31
%	4%	22%	6%	14%	26%
Non-Financial CP	33	28	43	3	Included in Financial CP
i%	1%	3%	2%	1%	
CD	126	126	146	109	0
%	3%	14%	8%	33%	0%
Repo	1069	188	208	55	0
%	22%	21%	12%	16%	0%
Other	3360	370	1239	120	90
%	70%	41%	71%	36%	74%

Notes: estimates are based on FSB members' proprietary information. Other includes investments in government securities. * The data for the Euro Area are from the ECB Securities Holding Statistics and only include paper issued by euro-area issuers and held by euro area holders. ** UK data refer to MMFs denominated in GBP rather than domiciled in the UK.

47 From the perspective of MMFs, ESMA data show that EU MMFs are mainly exposed to non-euro area banks (33% of assets), euro area banks (31%), other non-euro area issuers (18%), euro area sovereigns (18%) and non-financial corporations (4%). See ESMA, *Consultation Report EU Money Market Fund Regulation – legislative review* (March 2021) for EU data.

48 Estimates for non-government funds in the euro area as a whole are not available, as the ECB data do not distinguish between different types of MMFs. Table A.A.2 reports information based on iMoneyNet data.

Table A.A.2: MMF investments in the EU by type of fund and currency as a proportion of their portfolios as of end-2020 (USD bn)

MMF type	CNAV	LVNAV			VNAV		
Currency denomination	USD	USD	EUR	GBP	USD	EUR	GBP
Financial CP(including ABCP)	0	59	38	43	4	24	1
%	0%	20%	28%	16%	25%	5%	21%
Non-financial CP	0	47	14	22	2	56	0
%	0%	16%	11%	8%	12%	11%	3%
CD	0	70	25	88	4	161	2
%	0%	24%	18%	33%	28%	33%	36%
Repo	33	52	17	48	3	34	0
%	22%	18%	12%	18%	17%	7%	8%
Other	116	66	41	67	3	219	1
%	78%	23%	30%	25%	19%	44%	32%

Note: data are based on iMoneyNet (for MMFs domiciled in Ireland and Luxembourg) and proprietary information from the Banque de France (for Euro-denominated VNAV funds that include French-domiciled MMFs). The coverage of iMoneyNet data is wider than the coverage of the euro area data reported in Table A.A.1 and as such there are some discrepancies in the figures reported. Other includes investments in government securities.

Annex B: Assessment framework

The assessment of the potential effects of the MMF policy options is based on information and analysis by the working group members; review of the literature; and feedback from stakeholder outreach. The analysis includes considerations that are relevant across jurisdictions, particularly the largest MMF markets. The areas of analysis examined as part of this assessment, including a brief description of and some key questions under each area, are presented below.

1. **Functions served by MMFs and MMF vulnerabilities.** This involves taking stock of the roles of MMFs for investors and for borrowers in the STFMs across major MMF jurisdictions. It also includes a review of MMF vulnerabilities and their interactions with STFMs. Questions to be answered include:

   - What types of investors use MMFs as a cash management vehicle and why? How does this differ across locations, fund types and currencies?

   - What types of financial institutions use MMFs as a funding vehicle and why? How does this differ across locations, fund types and currencies?

   - What types of non-financial corporates and public authorities use MMFs as a funding vehicle and why? How does this differ across locations, fund types and currencies?

   - What makes MMFs vulnerable to runs amid liquidity and credit shocks? How have MMF vulnerabilities contributed to problems in the STFMs during episodes of financial stress, and vice versa?

2. **Description of the policy option and what it aims to accomplish.** This involves describing each option in detail and giving a brief explanation of how it intends to enhance resilience for MMFs and STFMs. It also involves a description of any relevant experience that jurisdictions may have with the option and implementation prerequisites for the option to have its intended effects. Questions to be answered include:

   - How would the policy option address structural vulnerabilities of MMFs? How would it affect MMFs' functions? Would it make MMFs more cash-like or fund-like?

   - Would it apply to all MMFs or only to certain types of funds? Would it apply at all times or under certain conditions?

   - Is the option currently in place in any jurisdiction, and if so, has it been helpful? How would it represent a change from current rules or practices in other jurisdictions? Has the option been previously considered and, if so, what were the main findings?

- Potential effects in parts 3-5 below are assessed relative to the baseline of the status quo, as reflected in both normal and stress periods, without unusual government interventions.

3. **Effects on investor behaviour.** This involves assessing how each option is likely to affect MMF investor incentives that are relevant to the funds' vulnerabilities in stress events. Questions to be answered include:

- From a micro perspective (viewing the MMF in isolation), how would the policy option affect the incentives of different types of investors to redeem during stress events?

- From a macro perspective, how would this option affect aggregate investor behaviour in a liquidity and/or credit shock?

- Does the option effectively shift MMF risks to investors? Does it make those risks more salient and transparent for investors?

4. **Effects on fund managers and sponsors.** This involves assessing how each option would affect the management of MMFs, including managers' and boards' incentives and tools that are relevant to the funds' vulnerabilities, as well as impacts on funds' capacity to provide funding and sponsors' business models. Questions to be answered include:

   - How would the policy option affect MMFs' liquidity management in normal versus stress periods?

   - How would it impact the ability or willingness of MMFs to invest in short-term funding instruments?

   - How would it affect risks and costs for sponsors and their willingness to support MMFs?

   - What operational and other implementation challenges would the option involve?

5. **Broader impacts on the stability and functioning of STFMs.** This involves examining the broader consequences of reform options on STFMs. Such consequences would depend in part on whether the option would make MMFs less cash-like or less fund-like, as that would affect whether and how investors and issuers are affected by that option. Questions to be answered include:

   - What are the likely effects on the size and composition of the MMF industry? Do the substitutes impact cross-border funding or investing?

   - To what extent does the policy option shift activities and risks to other parts of the financial system? Where are investors likely to move if MMFs become less attractive for cash management purposes as a result of the policy option? Do these substitutes have vulnerabilities to runs? Are they transparent to investors and regulators?

   - What alternative sources of short-term funding are available for borrowers that currently rely on MMFs for financing? Are these alternative sources more stable than MMFs? Are they available at a sufficient scale? Are they more costly?

   - Would the policy option have different effects on MMFs denominated in domestic and foreign currencies?

The overall assessment brings together the findings from parts 3-5 above in order to present in a systematic manner the most relevant pros, cons and considerations of each option.

Annex C: Assessment of variants of MMF policy options

Variant option to swing pricing: authorities mandating macroprudential swing pricing

Description

In normal times, the activation of swing pricing would be left at the discretion of the managers. During stress periods, authorities would have the ability to change the swing parameters (factor and threshold). The swing pricing parameters (threshold, minimum factor) would be calibrated by authorities and be based on systemic risk indicators common to all funds, as well as specific fund-level factors (e.g. inflows/outflows, portfolio liquidity). The use of systemic risk indicators would enhance the macroprudential component of this tool. These indicators would be chosen to reflect stress in money markets (e.g. abnormal volatility in the yields of CP/CDs or the widening of short-term sovereign spreads).

Assessment

Swing pricing could materially reduce redemption risk and reduce or remove first-mover advantages arising from mutualised liquidity, if it is implemented in a manner that is likely to pass on to redeeming investors all of the costs they impose on the fund. Effects of this variant would depend on the approach authorities use to define ‘stress periods’ and how they would calibrate the swing parameters. This is a challenging task. On the one hand, greater transparency would make activation of swing pricing easier to anticipate, which could trigger pre-emptive redemptions. On the other hand, less transparency adds uncertainty for investors regarding the liquidity/prices of their shares and could therefore decrease demand for MMFs.

The success of this measure would depend critically on authorities being able to adequately monitor liquidity conditions in money markets as well as in individual funds (including having the necessary granular data). Currently, authorities do not have access to real time data and lack relevant knowledge of the investor base and asset classes.

The potential for authorities’ intervention during episodes of stress introduces an additional risk under this variant, relative to the representative option (swing pricing at fund level). In particular, investors in all MMFs (not only those perceived as most at risk) could perceive a first-mover advantage in redeeming if they anticipate that authorities would require activation of swing pricing for all MMFs.

The broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – are similar to those of the representative option (swing pricing at fund level). Effects on the size of the MMF industry would depend in part on the preferences of current MMF investors and fund managers/sponsors. To the extent that this variant of swing pricing reduces demand for non-public debt MMFs, it would likely do so by diminishing their attractiveness for cash management. This would likely contribute to growth in cash management alternatives, potentially bank deposits and public debt MMFs in jurisdictions where they are available. On balance, these shifts would enhance financial stability, although funding sources for borrowers would become less diverse and more costly.

Variant option to capital buffer and MBR: sponsor support

Description

Under this option, the MMF sponsor would be able to provide capital support to MMFs under predefined conditions (in a 'stress period'). The support, including precise details regarding the entity providing it, would have to be disclosed to investors in the MMF's documents. Run risk and first mover advantage (FMA) would be reduced, but contagion risks to the sponsor providing the support would increase (interconnectedness).

Assessment

Demand for MMFs with explicit sponsor support would increase, while demand for other MMFs might decline. Investor appetite would likely shift to MMFs sponsored by firms with large financial resources, such as banks and insurance companies. The risk of runs would be reduced during stress periods unless sponsors are unable to fulfil expectations that they will provide support – in that scenario, run risk could increase sharply.

There would be a positive impact on the ratings of MMFs that are likely to be supported in crises, although the rating of the sponsor may be adversely impacted given such contingent support.

This option would also provide loss-absorption capacity as the sponsor could absorb some losses depending how the sponsor intervenes.[49] FMA would decrease, although the activation of sponsor support could itself trigger runs and create focal points if support is limited (either in absolute terms or as a percentage of a fund's total assets).

Sponsor support would reduce the procyclicality related to asset sales by MMFs but would increase contagion effects between MMFs and sponsors, which might be counterproductive from a financial stability perspective; the exact design of the support arrangements, such as limits to the support as well as conditions for the activation, could mitigate this risk.

The overall merits of this option depend largely on the types of MMFs it would apply to and how the option is implemented, including how the stress period is defined (and who determines that stress has occurred), whether the activation of the support is mandatory or discretionary, and how it would be operationalised.

Although sponsor support would only be activated in stress periods, risk management in normal times could also be affected: MMFs could be incentivised to take more risk in the knowledge that sponsor support will be available in the stress periods, or – depending on the conditions of support – MMFs could be incentivised to invest in more liquid assets to reduce the potential need for sponsor support.

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[49] If the sponsor support provides liquidity to the MMF by buying only the best quality assets, then the credit risk borne by the investors in the MMF would actually increase while the sponsor's risk to record losses would be limited. On the contrary, if the sponsor commits support by buying a representative sample of the assets held by the MMF (vertical slicing) or by purchasing shares in the MMF so that the MMF does not need to sell assets, then the sponsor would bear the same risks as the investors remaining invested in the MMF.

This option could create an uneven playing field as sponsors affiliated with banks and other firms with significant resources might be better placed to provide support than others. Explicit sponsor support could raise the costs of operating MMFs. MMFs might need to be consolidated if support becomes mandatory.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – the additional effects are likely to be modest but slightly negative. MMF net yields would fall somewhat if sponsors pass on the costs of support to their funds, while the utility of MMFs for cash management could be enhanced somewhat; on net, shifts in investor demand are likely to be minor. The MMF industry would become more concentrated, as sponsors with substantial financial resources would have advantages in providing support. In addition, depending on each jurisdiction's rules and practices, this could lead to a shift of risks from MMF investors to sponsors and increase interconnectedness of sponsors and STFMs.

Variant option to capital buffer and MBR: Liquidity exchange bank

Description

A dedicated commercial bank would be created (a 'Liquidity Exchange Bank', or LEB) to purchase eligible instruments from MMFs at fair value. By providing external liquidity support to MMFs in times of crisis, an LEB could improve the resilience of MMFs.

Assessment

Demand for MMFs might increase since investors would be less subject to liquidity risks. Yields offered to investors would likely be lower, if MMF sponsors fund the facility and pass the costs on to investors in the form of higher fees.[50]

FMA might be lower since the existence of the liquidity backstop would reduce incentives to redeem ahead of other investors (although indications that an LEB is running out of capacity could accelerate runs).

MMF portfolio composition could shift, as MMFs would invest more in the assets that are designated as eligible for support from the liquidity exchange bank.

This option can increase costs for MMF sponsors, if they have to fund the liquidity exchange bank, although some of the costs might be passed on to investors.

This option likely would face significant operational, governance, and legal hurdles. Prior proposals have envisioned complex setup procedures and challenges around governance

[50] To the extent that capacity had to be built up within a liquidity support facility, e.g. by a levy on the MMF sector, that would lead to reduced yields on MMFs in the short- to medium-term.

arrangements and oversight.[51] For instance, recent analysis suggests that an LEB would face considerable legal obstacles in the US.[52]

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – effects are likely to be modest but slightly negative. MMF net yields would likely fall as managers pass on the costs of setting up and running the LEB, while the utility of MMFs for cash management could be enhanced somewhat; on net, shifts in investor demand are likely to be minor. In addition, depending on how the LEB would be allowed to support MMFs in episodes of stress, its operations could lead to a shift of risks from MMF investors (and sponsors) to the LEB, which would be a leveraged financial institution, and this could increase risks to financial stability outside the MMF industry.

Variant option to removal of ties between regulatory thresholds and imposition of fees/gates: authorities approving activation of fees and gates

Description

Under this variant, current rules tying liquidity levels to the potential use of fees and gates would remain but MMFs would need to receive the approval of authorities to activate fees and gates.

Assessment

The impact on investors would be limited, since the breach of regulatory thresholds could still lead to the activation of fees and gates.

Since this option would not change the use of MMFs as cash-like instruments, funds would still be exposed to the risk of large redemptions in times of liquidity stress. Contagion effects could arise when one MMF imposes fees or gates.

This option does not shift MMF risks to investors but would transfer some risks to regulators (reputational risks related to approval or denial of requests to activate fees or gates) and could present operational challenges in a crisis (as regulators may need to make many decisions quickly).

During times of stress, liquidity management would be made more difficult and less timely since MMFs would need to obtain formal approval from the authorities.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – additional effects are likely to be insignificant, as this option would not have material impacts on investor demand for MMFs, sponsors' willingness to offer them, or MMF investments.

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51 See, for example, *ICI comment letter regarding President's Working Group Report on Money Market Fund Reform Options* (File No. 4-619), (January 2011).

52 See PWG, *Overview of Recent Events and Potential Reform Options for Money Market Funds* (2020).

Variant option to removal of ties between regulatory thresholds and imposition of fees/gates: MMF investor concentration limits

Description

This option would require disclosure of MMF investor concentration to authorities and restrict the portion of shares that can be owned by a single investor. As a result, redemptions by a single investor would be less likely to cause significant stress at a fund and lead to outcomes of concern to investors, such as suspensions of redemptions.

Assessment

Investor demand might be marginally lower, as large investors would need to reallocate their investments across several MMFs to comply with the concentration limit. If investors were unable to find enough MMFs over which to spread their investments, they may switch to substitutes, which would reduce investor demand for MMFs.

Since this option would not change the use of MMFs as cash-like instruments, funds would still be exposed to the risk of large redemptions in times of liquidity stress. But liquidity management would be made easier, since MMF managers would be more likely to observe smaller redemptions across several of their funds at the same time rather than a single large redemption, and so the effect on individual liquidity buffers would be smaller. From a macro perspective, if large investors with investments spread across numerous MMFs were to redeem, several MMFs would face redemptions at the same time, which could contribute to contagion effects.

This option would not change the incentives for investors to redeem.

The implementation of this option could raise operational challenges for fund managers and intermediaries, who would have to monitor data on investors' shares in a timely manner to enforce concentration limits. Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – additional effects are likely to be insignificant, as this option would only marginally affect investor demand for MMFs and would have little effect on sponsors' willingness to offer MMFs or the composition of MMF investments.

Variant option to removal of ties between regulatory thresholds and imposition of fees/gates: countercyclical liquidity buffer

Description

This option aims to give funds greater flexibility to use their liquid assets in times of stress to meet redemptions. By facilitating funds' use of internal liquidity (maturing assets) instead of selling assets to meet redemptions, the option could reduce liquidity costs associated with redemptions, diminish FMA, and mitigate the risk of pre-emptive runs by investors seeking to leave a fund before regulatory liquidity requirements are breached. This option could involve providing flexibility on minimum liquidity requirements in certain circumstances, such as when net aggregate redemptions or inflows are sudden and disruptive or upon authorities' granting of temporary relief from minimum liquidity requirements (e.g. WLA or/and daily liquid asset

minimums). Any regulatory triggers linked to a fund's minimum weekly liquidity requirements (e.g. fees or gates) would also move with the new minimum.

Alternatively, the WLA could be calibrated at a higher level than under current rules and include a buffer set by the regulators based on stress tests results for each fund. This could be based either on a fund-level assessment, taking into account a fund's investor base and liquidity profile, or an assessment for a group of funds. Such a buffer could be released in periods of system-wide stress, either at the initiative of the authority or by the managers in the interest of investors and financial stability purposes. In the latter case, the manager could be expected to ask for the authority's prior authorisation. To avoid any unintended consequences, the buffer's size could remain undisclosed.

Assessment

This option would not have a major effect on any of the key features of MMFs, although a higher level of WLA with a buffer option likely would reduce yields paid to investors. Nevertheless, during the stress periods, the potential lack of transparency on the holdings of liquid assets in some jurisdictions might give rise to uncertainty about the liquidity profile of the fund.

This option could mitigate FMA somewhat, depending on how investors assess the likelihood of imposition of liquidity management tools and of the liquidity risk profile of the funds in normal vs stress times. Nonetheless, incentives to run pre-emptively would remain as long as investors see a correlation between the regulatory WLA limits and the likelihood of liquidity management tools.

In normal times, managers might tend to decrease their WLA closer to the regulatory thresholds, unless faced with regulatory limitations and transparency requirements.

In stress times, this option would allow managers to manage their liquidity more freely, although it doesn't offer sufficient incentive to do so, and managers might still not use the releasable buffers because of stigma and concerns about credit rating downgrades of their funds.

This option doesn't affect MMF operational costs except for the resources that might be needed (if buffers are adjusted on a fund-by-fund basis) to implement more frequent stress testing to allow proper calibration of buffers.

Should required WLA holdings increase in normal times, MMFs would have to invest more in liquid short-dated instruments and would reduce exposures to less liquid instruments (such as longer-dated CP or CDs). This effect would be reversed in stress times however.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – additional effects are likely to be insignificant, as this option would not have material impacts on investor demand for MMFs, sponsors' willingness to offer them, or MMF investments.

Variant option to limits on eligible assets: limit MMFs to public debt MMFs

Description

This option would require MMFs to invest only in government debt and repo backed by such debt, which would make MMFs significantly more cash-like. This would eliminate MMFs' exposures to less liquid assets such as CP and CDs and make it significantly easier for funds to meet large redemptions by disposing of their assets.

Assessment

This option would reduce liquidity transformation and FMA, as government debt is generally more liquid than private debt and funds would have more liquid assets to dispose of to meet redemptions. The risk of larger redemptions due to liquidity shocks remains, but their consequences would be less damaging.

MMFs would no longer be allowed to invest in private short-term debt instruments like CP and CDs. Risks and cost for sponsors would fall as the likelihood of scenarios in which sponsors are pressured to provide support would fall (to the extent sponsors are permitted to provide support).

Overall, this option would have a material positive impact on the resilience of MMFs since MMFs would be in a better position to meet large redemptions by disposing of more liquid assets. Thus, the risk of runs, suspensions, and other problems during periods of stress would be diminished, and the likelihood of MMFs requiring external support (including central bank support) would be reduced.

This option could present challenges for the MMF business model in some jurisdictions and in some currencies. Short-term sovereign issuance is limited in some jurisdictions, which would constrain growth of government MMFs. Challenges might also be larger in jurisdictions where sovereign yields are negative, as they could make government MMFs uneconomical.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – this option would diminish yields that MMFs offer to investors and could cause a shift to investment-like alternatives for investors who value yield . The scale of this shift would likely be larger in jurisdictions where sovereign yields are very low or negative. Investment-like alternatives could include short-term bond funds and similar products and – for large investors – direct investment in money market instruments. Growth in these substitutes would have varying net effects on financial stability, as short-term bond funds present roughly similar risks while direct investing carries somewhat lower risks. For borrowers, these changes would reduce the diversity of funding sources and make short-term funding more costly. These effects on borrowers would be more pronounced than the effects of most other options assessed in this report.

Variant option to limits on eligible assets: liquidity-based redemption deferrals

Description

An alternative set of variations could reduce liquidity transformation by reducing the liquidity of MMF shares rather than increasing the liquidity of their assets. Liquidity-based redemption deferrals would allow only a fraction of each redemption request to be met on the same day. This fraction would depend on the share of very liquid assets held by the fund. This would effectively divide investors' claims into two tiers, a liquid portion of each share that is redeemable daily and a less-liquid portion that is only available with a delay.

Assessment

MMFs would become less cash-like since only a fraction of MMF shares could be redeemed daily. Demand for MMFs would decline, as investors shift to alternatives due to the liquidity risk they would face when redeeming.

FMA may be reduced, since each investor would be subject to a limit on the amount of daily liquidity available from MMF shares.

However, this option might create new focal points around the share of very liquid assets held by MMFs since that share determines the amount of available daily liquidity. If investors expect the share of ultra-liquid asset to decline, they might redeem pre-emptively. In addition, if investors are only able to obtain a portion of their shares in cash immediately, they may increase the size of their overall redemptions to obtain the cash they need.

This option would impose liquidity restrictions on investors even in normal market conditions.

Operationally, this option would increase the cost for the sponsor substantially, as funds would have to dynamically adjust the fraction of redemptions that is available immediately and track deferred redemptions as shareholders are making additional transactions, and such costs could make the MMF business model unviable.

Overall, this option would have a positive impact on the resilience of MMFs since MMFs would face lower redemptions and the amount of redemptions would be in line with the share of ultra-liquid assets held by the MMF.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – this option would make MMFs substantially less cash-like and also diminish dramatically the attractiveness of MMFs relative to other investment funds. As such, this option would likely cause substantial shrinkage of MMFs, large shifts by investors to substitutes with cash-like features, potentially bank deposits and public-debt MMFs (in jurisdictions where they are available), as well as some shifts to investment-like alternatives, such as short-term bond funds. On net, these shifts could provide some additional financial stability if investors shift primarily to cash-like alternatives; otherwise, effects would be more neutral. For borrowers, these changes would reduce the diversity of funding sources and make

short-term funding more costly. These effects on borrowers would be more pronounced than the effects of most other options assessed in this report.

Variant option to limits on eligible assets: non-daily dealing

Description

MMFs would no longer offer daily redemptions. The frequency of redemptions would be aligned with the liquidity of the assets, such as weekly or biweekly redemptions. Investors would be subject to a notice period between the day of redemption and the settlement of the MMF shares.

Assessment

MMFs would no longer be considered cash-like. Demand for non-public debt MMFs would substantially decline, as investors shift to more liquid alternatives, including public debt MMFs.

FMA would be reduced, since each investor would be subject to a delay before obtaining cash from redemptions.

This option would impose liquidity restrictions on investors even in normal market conditions.

This option could have some costs for MMF sponsors, as they would have to implement a system to deal with notice periods.

Overall, this option would have a positive impact on the resilience of MMFs, since MMFs would perform less liquidity transformation.

Regarding the broader implications of this variant for STFM resilience – beyond its direct effects on MMF vulnerabilities – this option would remove the cash-like feature of non-public debt MMFs and dramatically diminish the attractiveness of those MMFs relative to public debt MMFs and other investment funds. As such, this option would likely cause substantial shrinkage of non-public debt MMFs, large shifts by investors to substitutes with cash-like features, potentially bank deposits and public-debt MMFs (in jurisdictions where they are available), as well as some shifts to investment-like alternatives, such as short-term bond funds. On net, these shifts could provide some additional financial stability if investors shift primarily to cash-like alternatives; otherwise, effects would be more neutral. For borrowers, these changes would reduce the diversity of funding sources and make short-term funding more costly. These effects on borrowers would be more pronounced than the effects of most other options assessed in this report.

Variant option to limits on eligible assets: Redemptions-in-kind

Description

During stress periods, MMFs would meet redemptions by transferring the assets held by the fund to redeeming institutional investors. By transferring liquidity risk to redeeming institutional investors, this option would reduce liquidity transformation and make MMFs more resilient.

Assessment

MMFs would become less cash-like. Demand for MMFs would decline, as institutional investors shift to more liquid alternatives.

FMA would be reduced, since redeeming institutional investors would face liquidity risks related to the sale of the instruments transferred to them by the fund. Therefore, these investors would have less incentive to redeem during stress periods and they would bear the liquidity risk.

This option creates some uncertainty for relevant investors since it is unclear how stress periods would be defined and by whom (for example, this could be at the discretion of the MMF or determined by authorities). If stress periods are defined based on observable factors, they might become a focal point for investors, who might pre-emptively redeem to avoid redemptions-in-kind.

Liquidity management for the MMFs might change because some instruments such as repo are generally not transferable. MMFs might invest more in transferable instruments such as CP or CDs.

The option could increase costs for funds, as they would need to put in place systems to execute in-kind redemptions (identify eligible investors, establish procedures for transferring assets), although large managers are likely to have such systems in place for other funds.

Overall, this option would have a positive impact on the resilience of MMFs, since MMFs would transfer some liquidity risk to redeeming institutional investors.

Regarding the broader implications of this variant for STFMs – beyond its direct effects on MMF vulnerabilities – redemptions-in-kind would make MMFs substantially less cash-like in times of stress but also diminish the attractiveness of MMFs relative to other investment funds. As such, this option would likely cause substantial shrinkage of MMFs used by institutional investors, large shifts by investors to substitutes with cash-like features, potentially bank deposits, as well as some shifts to investment-like alternatives, such as short-term bond funds. An additional effect outside the MMF sector would come during periods of stress, when investors who receive assets in-kind might seek to dispose of them, which could contribute to stress (although in disposing of assets, these investors would incur liquidity costs themselves, which would diminish incentives to sell). On net, these shifts could provide some additional financial stability if investors shift primarily to cash-like alternatives; otherwise, effects would be more neutral. For borrowers, these changes would reduce the diversity of funding sources and make short-term funding more costly. These effects on borrowers would be more pronounced than the effects of other options assessed in this report.

Annex D: Glossary of terms

Amortised cost (method): Amortised cost is an accounting method in which all financial assets must be reported on a balance sheet at their amortised value. The amortised value is equal to the acquisition total of the asset minus their principal repayments and any discounts or premiums minus any impairment losses.

Anti-dilution levy: An anti-dilution levy is a charge applied to individual transacting investors, payable to the fund, to protect remaining investors from bearing the costs associated with a MMF's purchases or sales of assets because of large inflows or outflows. An anti-dilution levy does not involve any adjustment to the value of the fund's shares (e.g. NAV).

Constant NAV MMF: A constant NAV (CNAV) MMF seeks to maintain an unchanging ("stable") NAV per unit or share. Assets are generally valued according to the amortised cost method and the NAV is rounded to the nearest percentage point.

First-mover advantage: First-mover advantage occurs when, under certain circumstances, investors who redeem their shares first do so on more favourable terms than investors in the same fund who redeem late. It can occur if, for example, the transaction costs for assets sold to meet redemptions are not properly allocated to redeeming investors. Another example of the first-mover advantage occurs if in a scenario of declining values of a fund's assets, investors can redeem before the fund's NAV adjusts to fully reflect those declines in value. An investor who redeems solely in anticipation of further market deterioration is not considered as benefiting from a first-mover advantage. First mover advantage may lead to pre-emptive runs (see below).

Government (public debt) MMF: A MMF that invests almost exclusively in government securities and repurchase agreements (repo) backed by government securities. For example, US and EU MMF regulations require such funds to invest at least 99.5% of their total assets in short-term government securities and repo backed by these securities.

LVNAV MMF (under EU regulation): A "Low Volatility" NAV (LVNAV) MMF is a type of short-term MMF in the European Union and the United Kingdom. Units in the fund are purchased or redeemed at a constant price, as long as the value of the assets in the fund does not deviate by more than 0.2% from par. If it breaches this threshold, then the NAV has to be valued on a mark-to-market basis until the fund's valuation returns to a position within its 0.2% threshold from par.

Partial redemption gates: Partial redemption gates are a liquidity management tool that limits the value of shares or units that can be redeemed in a single valuation/dealing day. These partial restrictions are generally applied on a pro-rata basis. For example, a five per cent redemption gate on a fund would mean that orders exceeding five per cent of the NAV of the fund are only partially executed (with some discretion for the fund). The non-executed portion of the orders are either cancelled or automatically carried over to the next valuation/dealing day.

Pre-emptive run: A pre-emptive run is a run that occurs because investors redeem in advance to avoid so-called cliff-edge events that can suddenly reduce the value or liquidity of and access to their shares, such as the imposition of liquidity fees or gates, or the outright suspension of redemptions. The exiting investor is better off redeeming before the changes occur than afterwards, which creates incentives to redeem that are similar to those stemming from a first mover advantage.

Prime MMF: A prime MMF, also called “non-public debt MMF” outside of the US, invests predominantly in non-government securities and repurchase agreements backed by various types of collateral, although it may also invest in government securities.

Sponsor: MMFs are, in most cases, managed by an asset management company that can be part of a wider financial/banking group or a stand-alone independent entity. The MMF’s sponsor is the asset management company, or the wider financial/banking group it forms part of.

Sponsor support: Sponsor support, where permitted, is generally discretionary and can take various forms, including the sponsor purchasing the assets of the MMF at an above-market price; purchasing units in the MMF in order to inject liquidity; or providing a back-up liquidity line or a guarantee or insurance to the MMF. It can also be any action, the direct or indirect objective of which is to maintain the liquidity profile and the NAV per unit or share of the MMF. Sponsor support is different from related-party transactions conducted on an arm’s length commercial basis that are not intended to support the NAV or liquidity of an MMF.

Suspension of redemptions (also referred to as “gates” in some jurisdictions): An action, usually taken by a fund manager, board, or sponsor, which prevents investors in the fund from withdrawing their capital. In some cases, it is a temporary measure for a short period of time while in others it is used to allow for an orderly liquidation of assets in the best interest of investors. The purpose of a suspension is to prevent a run on a fund in times of idiosyncratic or market-wide stress. Suspensions can also be used when the valuation of the portfolio cannot be properly performed (e.g. during exceptional market events affecting a large proportion of the underlying assets). While partial redemption gates allow some redemptions, suspensions do not allow any redemptions at all.

Swing factor: The swing factor is the amount a fund’s NAV per share swings up or down. It is usually determined by the fund manager and is typically based on estimates of the transaction costs that will be incurred to trade the underlying assets of the fund to meet investor requests, but can also include projected investor flows and market impact. The swing factor adjusts the NAV up for periods of net inflows and down for periods of net outflows.

Swing pricing: Swing pricing is a liquidity management tool that applies a dilution adjustment to a fund’s NAV to pass on to investors who redeem or purchase shares the liquidity costs stemming from net flows into or out of the fund. The fund usually has an established threshold at which it activates its partial swing. Swing pricing seeks to protect remaining investors, from the dilution of their holdings. The ability to use swing pricing is usually defined a priori during the design phase of the fund and set out in a fund prospectus.

Where a fund has full swing pricing, its NAV swings (adjusts) every day on which there are any net subscriptions or net redemptions, irrespective of the size of this activity. The direction of the swing is determined by the direction of flow for the day (the NAV swings down when the fund has net outflows and up for net inflows).

Swing threshold: In partial swing pricing, the swing threshold is the amount of daily net purchases or net redemptions, usually expressed as a percentage of NAV, which must be exceeded before a swing (adjustment) of the NAV occurs. It is usually determined by fund managers and is expressed as a fixed percentage of a fund’s NAV calculated using daily transaction information. This figure is not necessarily disclosed to investors.

Abbreviations

AUM	Assets under management
CCP	Central counterparty
CD	Certificate of deposit
CNAV	Constant net asset value
CP	Commercial paper
EU	European Union
FMA	First mover advantage
FSB	Financial Stability Board
IOSCO	International Organization of Securities Commissions
LEB	Liquidity Exchange Bank
LIBOR	London Interbank Offered Rate
LVNAV	Low volatility net asset value (EU MMF type)
MBR	Minimum balance at risk
MMF	Money market fund
MMFR	Money Market Fund Regulation (EU)
NAV	Net asset value
NBFI	Non-bank financial intermediation
SEC	US Securities and Exchange Commission
STFMs	Short term funding markets
TEG	Technical Expert Group
USD	United States dollar
VNAV	Variable net asset value
WAM	Weighted average maturity
WLA	Weekly liquid assets