FSB FINANCIAL STABILITY BOARD

Enhancing the Resilience of Non-Bank Financial Intermediation

Progress report

10 November 2022

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Executive Summary

This report describes progress over the past year and planned work by the FSB, as well as by standard-setting bodies (SSBs) and other international organisations, to enhance the resilience of non-bank financial intermediation (NBFI).

Conjunctural factors and structural changes in the global financial system over the past decade have increased the reliance on market-based intermediation. NBFI has grown considerably – to almost half of global financial assets, compared to 42% in 2008 – and become more diverse. As a result, the importance of NBFI for the real economy has increased and continues to grow.

The March 2020 turmoil has underscored the need to strengthen resilience in the NBFI sector, as public authorities needed to take a wide range of measures to restore market functioning. Building on the lessons from the turmoil, the FSB developed a comprehensive NBFI work programme to examine and, where appropriate, address specific issues that contributed to amplification of the shock; enhance understanding and strengthen the monitoring of systemic risk in NBFI; and assess policies to address systemic risk in NBFI. Developments since March 2020, including the failure of Archegos and strains in commodities and bond markets, underscore the importance of adopting policies to address identified NBFI vulnerabilities.

The functioning and resilience of the NBFI ecosystem depends on the availability of liquidity and its effective intermediation under stressed market conditions. If liquidity imbalances become sufficiently large and pervasive, they may give rise to financial instability. These imbalances can be the result of the interaction of large and unexpected shifts in liquidity demand, insufficient supply of liquidity in stress and various amplification mechanisms. The interactions can give rise to fire sales and the transmission of stress to other parts of the financial system and the economy. Given this, the main focus of the FSB's work over the past year was to assess and address vulnerabilities in specific NBFI areas that may have contributed to the build-up of liquidity imbalances and their amplification in times of stress.

The report presents the main findings of the work by the FSB and SSBs in these areas. This includes policy work to enhance money market fund (MMF) resilience; assessing effectiveness of international policies to address liquidity risk and its management in open-ended funds (OEFs); an examination of the frameworks and dynamics of margin calls in centrally cleared and non-centrally cleared derivatives and securities markets; work to examine the liquidity, structure and resilience of core bond markets; and an assessment of the fragilities in USD cross-border funding and external vulnerabilities in emerging market economies (EMEs).

The work conducted this year augments the framework for NBFI resilience presented in last year's progress report by identifying a set of activities and types of entities, or "key amplifiers", that may particularly contribute to aggregate liquidity imbalances and the transmission and amplification of shocks due to their size, structural characteristics and behaviour in stress.

On the liquidity demand side, this includes activities that give rise to liquidity mismatches (which are particularly prevalent in some types of non-bank entities, such as certain MMFs and OEFs); unexpectedly large margin calls for derivatives and securities trades; mismatches associated with external funding and currency mismatches (e.g. considering the global use of the US dollar as a borrowing and investment currency); and leverage. On the liquidity supply side, this includes factors that reduce the ability of bank and non-bank liquidity providers to absorb large spikes in

liquidity demand, as well as other impediments stemming from the structure of core wholesale funding markets, which is characterised by limited standardisation, low levels of automated trading and turnover, and heavy reliance on dealer intermediation.

The report includes a set of policy proposals to address systemic risk in NBFI, focusing on key amplifiers. These proposals aim to reduce liquidity demand spikes; enhance the resilience of liquidity supply in stress; and enhance risk monitoring and the preparedness of authorities and market participants. The main focus of the proposals is to reduce excessive spikes in the demand for liquidity by addressing the vulnerabilities that drive those spikes (e.g. by reducing liquidity mismatch or the build-up of leverage) or by mitigating their financial stability impact (e.g. by ensuring that redeeming investors pay the cost of liquidity and by enhancing the liquidity preparedness of market participants to meet margin calls). Policies to enhance the resilience of liquidity provision in stress are also very important, though they are more difficult to implement as they require longer-term structural changes and tend to be country-specific.

The policy proposals involve largely repurposing existing policy tools rather than creating new ones, given the extensive micro-prudential and investor protection toolkit already available. However, experience with the use of these tools for systemic risk mitigation in NBFI is limited to date. The FSB will assess in due course whether repurposing such tools is sufficient to address systemic risk in NBFI, including the need to develop additional tools for use by authorities.

The report includes two key sets of policy proposals to address spikes in liquidity demand. The first set involves revisions to the FSB and IOSCO Recommendations to address structural liquidity mismatch in OEFs and promote greater inclusion and use of liquidity management tools; the development of detailed guidance on the design and use of those tools; and work to enhance availability of OEF-related data for financial stability monitoring. The second set comprises policy work on increasing transparency in centrally cleared markets; enhancing the liquidity preparedness of market participants as well as liquidity disclosures; identifying data gaps in regulatory reporting; streamlining variation margin processes in centrally and non-centrally cleared markets; and evaluating the responsiveness of both centrally cleared and non-centrally cleared initial margin models to market stresses. In addition, the FSB and SSBs will carry out further work to assess and, where necessary, take policy action to address vulnerabilities associated with leverage, particularly those related to “hidden” leverage in NBFI.

To enhance the resilience of liquidity supply in stress, individual authorities may wish to explore: ways to increase the availability and use of central clearing for government bond cash and repo transactions; the use of all-to-all trading platforms; and measures to enhance the transparency of bond and repo markets. In addition, the report proposes a number of policy measures that seek to reduce EME vulnerabilities stemming from external funding and non-bank financing, as well as to enhance their crisis management tools. The FSB and IOSCO will carry out work to enhance the functioning and resilience of short-term funding markets, and will also consider additional work in due course to enhance resilience of liquidity provision in core bond markets.

Finally, the FSB will develop additional metrics and tools to monitor NBFI vulnerabilities; enhance its analysis of NBFI vulnerabilities through targeted deep dives; and integrate findings from the work on the use of already available data (e.g. in trade repositories) for monitoring systemic risk.

Table 1 below provides an overview of the FSB’s work programme on NBFI for 2023 and beyond. This includes further work on non-bank leverage and margining practices, whose importance has been reinforced by recent market developments. Table 2 describes work already completed.

Table 1: Planned deliverables under the FSB's NBFI Work Programme

Topic	Deliverable	Timing
Resilience of money market funds (MMFs) and short-term funding markets	FSB, working with IOSCO, to take stock of the MMF policy measures adopted by FSB member jurisdictions	End-2023
	FSB, working with IOSCO, to assess the effectiveness of MMF reforms in addressing risks to financial stability	End-2026
	FSB and IOSCO to carry out work to enhance functioning and resilience of short-term funding markets	End 2023
	IOSCO to revisit its *Policy Recommendations for MMFs* in light of the framework and policy toolkit in FSB report	TBD
Liquidity risk and its management in open-ended funds (OEFs)	FSB, in consultation with IOSCO, to revise the 2017 FSB Recommendations on liquidity mismatch in OEFs	Consultative report in mid-2023; final report in late 2023
	IOSCO to operationalise revised FSB Recommendations through amendments to the 2018 IOSCO Recommendations and supporting good practices	TBD (following the revisions to the FSB Recommendations)
	IOSCO, in consultation with the FSB, to develop detailed guidance on liquidity management tools to complement the revised FSB Recommendations	Consultative report in mid-2023; final report in late 2023
	FSB, in consultation with IOSCO, to initiate a pilot programme focused on closing identified data gaps relating to OEF liquidity mismatch, the use of LMTs, and attendant financial stability risks	Pilot programme in 2023; follow-up work as needed in 2024
	FSB and IOSCO to organise a workshop on experiences among authorities on design/use of stress tests for OEFs	Late 2023/early 2024
Margining practices	BCBS-CPMI-IOSCO and FSB to carry out follow-up policy work on transparency in centrally cleared markets; liquidity preparedness of market participants and liquidity disclosures; data gaps in regulatory reporting; variation margin processes; and the responsiveness of initial margin models to market stresses	2023 and beyond
Non-bank leverage	FSB, in consultation with IOSCO, to carry out work to assess and, where necessary, address vulnerabilities associated with leverage in NBFI	2023 and beyond
Developing a systemic risk perspective in NBFI	FSB to enhance its assessment of vulnerabilities in NBFI and report on implementation of G20 NBFI reforms	2022 and beyond
	FSB to publish a revamped Global Monitoring Report reflecting the findings from NBFI work	2022 and beyond
Developing policies to address systemic risk in NBFI	FSB to publish report with main findings of NBFI initiatives and any further policy proposals to address systemic risk in NBFI	2023Q4

Table 2: Deliverables already completed under the FSB's NBFI Work Programme

Topic	Brief description	Timing
1. Analytical and policy work on specific issues		
Money market fund (MMF) resilience	To make policy proposals, in light of the March experience, to enhance MMF resilience including with respect to the underlying short-term funding markets	FSB MMFs report (October 2021)
Liquidity risk and its management in OEFs	To examine the availability and effectiveness of liquidity risk management tools for OEFs, including the experience of redemption pressures and use of tools in the March turmoil and their aggregate impact on the market	FSB and IOSCO reports forthcoming
Margining practices	To examine the frameworks and dynamics of margin calls in centrally cleared and non-centrally cleared derivatives markets and the liquidity management preparedness of market participants to meet margin calls	BCBS-CPMI-IOSCO report (September 2022)
Liquidity, structure and resilience of core bond markets	To examine the structure and liquidity provision in core funding markets during stress, including the role of leveraged investors and factors that limit dealer capacity to intermediate	IOSCO corporate bond markets report (April 2022) BIS Markets Committee paper (May 2022) FSB government bond markets report (October 2022)
2. Systemic risk assessments		
Strengthening the ongoing monitoring of NBFI risks	To assess NBFI risks in light of COVID-19 developments and lessons from the March turmoil	Annual FSB Global Monitoring Reports
Advancing the understanding of systemic risks in NBFI and the financial system	To deepen the analysis of structural and interconnectedness issues in NBFI, including the interaction of USD funding pressures and fund outflows in emerging market economies, as input into enhanced risk monitoring and discussions on policies to address systemic risks in NBFI	FSB USD funding report (April 2022) FSB NBFI progress reports (November 2021 and 2022), public workshop (June 2022)
3. Policies to address systemic risks in NBFI		
Policies to address systemic risks in NBFI	To examine policies to address systemic risks in NBFI, including the adequacy of current policy tools and the concept and desired level of resilience in NBFI	FSB NBFI progress report (November 2022)

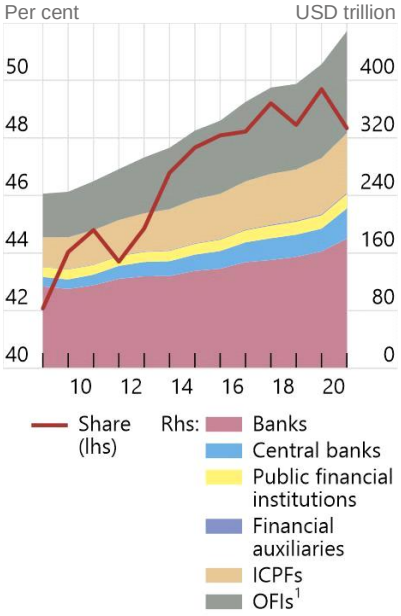
1. Introduction

This report describes progress over the past year and planned work by the FSB, as well as by standard-setting bodies (SSBs) and other international organisations, to enhance the resilience of non-bank financial intermediation (NBFI) under the FSB's NBFI work programme.[1]

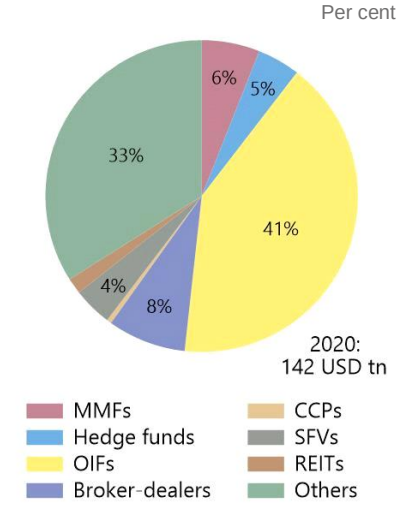
Conjunctural factors and structural changes in the global financial system over the past decade have increased the reliance on market-based intermediation. NBFI has grown considerably – to almost half of global financial assets, compared to 42% in 2008 – and become more diverse over this period. As a result, the importance of NBFI for the real economy has increased and is likely to continue to grow (Graph 1). Underlying drivers for this growth have included long-term demographic trends leading to asset accumulation; macro-financial factors such as accommodative monetary policies; rising valuations; and the post-2008 crisis reforms, which have increased the relative cost of bank-based finance. With the overall growth of debt markets and NBFI, funding and market liquidity have become more central to financial resilience.

The importance of NBFI for the real economy has increased **Graph 1**

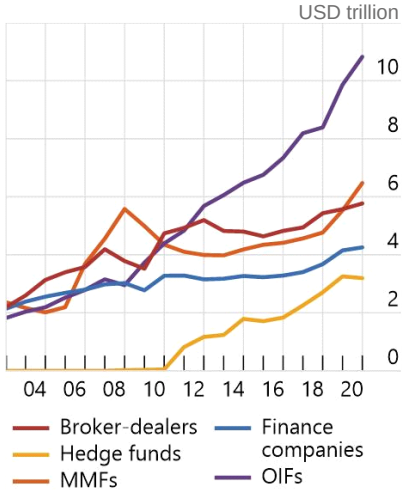
NBFI asset's rising share in total financial assets



Share of OFI's major subsectors to total OFI assets



Credit assets held by selected OFI sub-sectors[2]



CCPs = central counterparties; ICPFs = insurance corporations and pension funds; MMFs = money market funds; OFIs = other financial intermediaries; OIFs = investment funds other than MMFs and hedge funds; REITs = real estate investment trusts and real estate funds; SFVs = structured finance vehicles. Data used in the charts above covers 21 jurisdictions and euro area.

[1] OFIs (other financial intermediaries) is a subset of the NBFI sector, comprising all financial institutions that are not central banks, banks, public financial institutions, insurance corporations, pension funds, or financial auxiliaries. OFIs include, for example, investment funds, captive financial institutions, and money lenders (CFIMLs), central counterparties (CCPs), broker-dealers, finance companies, trust companies and structured finance vehicles. [2] Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level.

Source: FSB Global Monitoring Report on Non-Bank Financial Intermediation 2021, FSB calculations.

[1] The FSB's NBFI work programme (and this report) does not cover intermediation activities related to crypto-asset markets. These are analysed separately and the FSB recently published policy recommendations in this area. See the FSB reports on International Regulation of Crypto-asset Activities: A Proposed Framework – For Consultation, Review of the FSB High-level Recommendations of the Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements: Consultative Report, and Regulation, Supervision and Oversight of Crypto-Asset Activities and Markets: Consultative Report (October 2022).

The March 2020 turmoil has underscored the need to strengthen resilience in the NBFI sector, as key funding markets experienced acute stress and public authorities needed to take a wide range of measures to restore market functioning and support the supply of credit to the real economy.[2] The exceptional measures taken by central banks to restore market confidence and functioning were not aimed at addressing the vulnerabilities that amplified the stress, so the underlying factors that caused liquidity imbalances and propagated the stress are still in place. Moreover, these interventions have meant that central banks had to take on material financial risk and could lead to moral hazard issues in the future. The changed macroeconomic environment since then – in particular, reduced growth outlook and higher global inflation – make it more difficult for authorities to intervene should a shock materialise, which further underscores the need to take policy measures to enhance the resilience of the NBFI sector.

Building on the lessons from the March 2020 market turmoil, the FSB developed a comprehensive NBFI work programme to examine and, where appropriate, address specific issues that contributed to amplification of the shock; enhance understanding and strengthen the monitoring of systemic risk in NBFI; and assess policies to address systemic risk in NBFI. The work programme also takes into account developments since March 2020, including the failure of Archegos Capital Management and strains in commodities and bond markets, with a view to identifying and addressing NBFI vulnerabilities from a forward-looking perspective. Enhancing NBFI resilience is intended to ensure a more stable provision of financing to the economy and reduce the need for extraordinary central bank interventions.

In last year's progress report[3] the FSB described a framework for enhancing NBFI resilience. In the framework, the functioning and resilience of the ecosystem depends on the availability of liquidity and its effective intermediation under stressed market conditions. If liquidity imbalances become sufficiently large and pervasive, they may give rise to financial instability. These imbalances can be the result of the interaction of large and unexpected shifts in liquidity demand (going well beyond the normal fluctuations that are part of price formation and portfolio management), insufficient supply of liquidity in stress and various amplification mechanisms. These interactions can give rise to fire sales and the transmission of stress to other parts of the financial system and the economy. Given this, the main focus of the FSB's work last year was to assess and address vulnerabilities in specific NBFI areas that may have contributed to the build-up of liquidity imbalances and their amplification in times of stress.

This year's progress report builds on the findings from the various NBFI workstreams and on the framework developed last year in two ways. First, it identifies a number of activities and types of entities (key amplifiers) in the NBFI sector that may contribute to large liquidity imbalances in stress, and may therefore give rise to financial instability. Second, it assesses the existing NBFI policy toolkit to ensure that it is adequate and effective from a system-wide perspective, and includes high-level policy proposals to enhance it.

The rest of the document is structured as follows:

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2 See FSB (2020), *Holistic Review of the March Market Turmoil*, November, for a detailed analysis of the events of March 2020.

3 See FSB (2021), *Enhancing the Resilience of Non-Bank Financial Intermediation – Progress report*, November.

- Section 2 presents the main findings of the work over the past year to assess and address vulnerabilities in particular NBFI entities and activities;
- Section 3 brings together and analyses these vulnerabilities from a system-wide perspective to illustrate the nature of systemic risk in NBFI;
- Section 4 assesses the existing NBFI policy toolkit and describes high-level policy proposals to enhance NBFI resilience; and
- Section 5 describes the way forward.

2. Progress in assessing and addressing vulnerabilities in specific areas

2.1. Enhancing money market fund (MMF) resilience

Vulnerabilities in MMFs can contribute to large and unexpected liquidity imbalances. MMFs are subject to two broad types of mutually reinforcing vulnerabilities: 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 and documented in official reports and rulemakings. In practice, these vulnerabilities have been significantly more prominent in non-public debt MMFs.

The FSB published its final report with policy proposals to enhance MMF resilience in October 2021.[4] The report 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 in the FSB report includes mechanisms to impose on redeeming fund investors the cost of their redemptions; to absorb losses; to address regulatory thresholds that may give rise to cliff effects; and to reduce liquidity transformation.

FSB members are assessing MMF vulnerabilities in their jurisdiction and will address them using the framework and policy toolkit in the final report, in line with their domestic legal frameworks. A number of member authorities have already published policy proposals on MMFs. For instance, in December 2021 the US Securities and Exchange Commission proposed amendments to the rules governing MMFs to, among other things, increase liquidity requirements; remove liquidity thresholds that allow or force certain funds to impose liquidity fees and suspend redemptions; and require institutional prime and institutional tax-exempt money market funds to implement swing pricing policies.[5] In February 2022, the European Securities and Markets Authority issued an opinion[6] with detailed proposals to remove threshold effects for constant net asset value (NAV) funds; increase the liquidity of MMFs; allow these

4 See FSB (2021), *Policy proposals to enhance money market fund resilience – Final Report*, October.

5 See SEC (2021), SEC proposes amendments to money market fund rules, December.

6 See ESMA (2022), ESMA proposes reforms to improve resilience of money market funds, February.

funds to use their liquidity buffers more easily; and require MMFs to have at least one liquidity management tool (LMT) available. Furthermore, the UK authorities published a discussion paper[7] in May 2022 with a number of potential policy options, including a reduction in the liquidity transformation carried out by MMFs and the use of LMTs.

The FSB will, working with IOSCO, review progress made by member jurisdictions in adopting reforms to enhance MMF resilience; IOSCO plans to revisit its 2012 Policy Recommendations for MMFs in light of the framework and policy toolkit in the FSB report; and 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 (see Table 1).

2.2. Liquidity risk and its management in open-ended funds

The FSB and IOSCO conducted analytical work in 2021 on the redemption pressures faced by open-ended funds (OEFs) in March 2020 and their drivers, as well as the extent to which fund vulnerabilities impacted the financial system and wider economy. In 2022, the focus of the FSB's work shifted towards assessing the effectiveness of its 2017 policy recommendations to mitigate vulnerabilities in OEFs stemming from liquidity mismatch (FSB Recommendations).[8] This took place in coordination with IOSCO's review of its 2018 recommendations on liquidity risk management for such funds (IOSCO Recommendations).[9]

Authorities have made meaningful progress in implementing the 2017 FSB Recommendations. Nevertheless, lessons learnt since the publication of the FSB Recommendations, including during the March 2020 market turmoil, have produced new insights into liquidity management challenges in segments of the OEF sector. While the assessment suggests that the FSB Recommendations remain broadly appropriate, enhancing clarity and specificity on the policy outcomes the FSB Recommendations seek to achieve would make them more effective from a financial stability perspective.

Many jurisdictions have set out high-level regulatory expectations on consistency between fund assets and investment strategies, and redemption terms and conditions, but there appear to be differences in the levels of specificity in these expectations across jurisdictions. Overall, the analysis of available data suggests that there has been no measurable reduction in the degree of structural liquidity mismatch since the FSB Recommendations were issued. As the OEF sector has grown in absolute terms, reflecting the increased importance of market-based finance, the potential impact of vulnerabilities that can arise from OEFs' structural liquidity mismatch has also grown.

Most jurisdictions permit OEF managers to implement a broad range of LMTs and available information suggests there has been a gradual increase in the inclusion of LMTs in OEF constitutional documents[10] since the publication of the FSB Recommendations. The use of anti-dilution LMTs increased during the height of the COVID-19 shock in response to increased

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7 See Bank of England and FCA (2022), Resilience of Money Market Funds, Discussion Paper DP 22/1, May.

8 See FSB (2017), *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*, January.

9 See IOSCO (20218), *Recommendations for Liquidity Risk Management for Collective Investment Schemes*, February.

10 These include fund prospectuses, other offering documents and other documents accessible to investors on an ex- ante basis before they make their investment decision.

redemption requests, especially for corporate bond funds, but available evidence points to material variation in swing factors across corporate bond funds using swing pricing. There remains room for greater uptake of LMTs, in particular anti-dilution tools that are intended to pass on the cost of liquidity to redeeming shareholders in both normal and stressed market conditions. When LMTs are available, cost, competitive or reputational concerns, as well as operational hurdles, may have prevented OEF managers from including them in OEF constitutional documents or using them.

Many jurisdictions enhanced their regulatory reporting requirements following publication of the FSB Recommendations, but there is variance in the scope, frequency and content of periodic reporting. In addition, many jurisdictions can collect more frequent ad hoc supervisory information from fund managers where necessary. These data are useful during market stress, but are less suited to ex ante vulnerabilities monitoring. The FSB encountered challenges obtaining and analysing data to support its assessment of the effectiveness of the FSB Recommendations. This suggests that measuring and monitoring liquidity mismatch as well as evaluating the availability, use and effectiveness of LMTs for assessing vulnerabilities in OEFs continue to be challenging for authorities.

While all surveyed jurisdictions require disclosure of fund liquidity risk to investors, more could be done to enhance these. Market participants agree that it is important to ensure adequate disclosure on the availability and use of LMTs by OEFs to protect investors and to allow them to factor these into their decision making.

Most surveyed jurisdictions require responsible entities to conduct ongoing liquidity assessments at fund level in different scenarios. Additionally, most jurisdictions have conducted some form of system-wide stress testing to capture the effects of collective selling by funds and other investors on the resilience of financial markets and the financial system more generally.

Based on this assessment, the FSB and IOSCO will carry out follow-up policy work to enhance the existing international recommendations and related guidance. Enhancements to the existing international recommendations and related guidance would significantly strengthen the current framework and OEF liquidity management practices, benefitting financial stability as well as investor protection. Such enhancements would involve revisions to the FSB and IOSCO Recommendations to address structural liquidity mismatch and promote greater inclusion and use of LMTs as well as to clarify the appropriate roles of fund managers and authorities in implementing these Recommendations; development of detailed guidance on the design and use of LMTs; work to enhance the availability of OEF-related data for financial stability monitoring; and steps to promote the use of stress testing (see section 4). Engagement with stakeholders, including through public consultation of the proposed revisions to the Recommendations and of the new guidance, would form a key part of this process.

First, FSB Recommendation 3, which deals with the consistency between a fund's investment strategies and the terms and conditions governing redemptions, should be revised to provide greater clarity regarding the redemption terms that OEFs could offer to investors, based on the liquidity of their asset holdings. Funds that allocate a significant proportion of assets under management (AUM) (e.g. 30-50% or more) to assets that are illiquid even in normal market conditions would need to offer liquidity to investors less frequently than daily and/or require long notice/settlement periods to redeem shares. Funds mainly holding less liquid assets, or assets that are more vulnerable to illiquidity in stressed market conditions, may offer daily dealing,

subject to fund managers being able to demonstrate to the authorities (in line with their supervisory approaches) that they can implement anti-dilution LMTs that pass on to redeeming investors the explicit and implicit costs of redemptions, including any significant market impact of sales. Alternatively, these funds would need to consider and use measures to reduce the frequency at which they offer liquidity to investors and/or implement longer notice/settlement periods, as appropriate.

Second, the FSB Recommendations 4, 5 and 8, which deal with the characteristics of LMTs should be strengthened to achieve: (i) greater inclusion in funds' constitutional documents of anti-dilution LMTs designed to pass on to redeeming investors the explicit and implicit costs of redemptions, including any significant market impact of asset sales to meet those redemptions; (ii) greater use, and consistency in use, of anti-dilution LMTs in both normal and stressed market conditions; and (iii) increased awareness among investors on the objectives and operation of anti-dilution LMTs. To complement and further strengthen the LMT framework, the FSB should also recommend that authorities require clearer public disclosures from fund managers on the LMTs available to each OEF they manage and on the use of these LMTs in normal and stressed market conditions. Moreover, the FSB should recommend that managers enhance their engagement with investors so that investors can better understand these disclosures and incorporate them in investment decisions.

Third, closing identified data gaps would improve authorities' ability to monitor liquidity mismatch and its management from a financial stability perspective. Progressing this work would include a voluntary pilot programme among FSB member jurisdictions for examining how to improve data availability, including the cost and effort needed to expand data coverage and reporting; and prioritising data gaps to close in order to improve both central banks and securities regulators' ability to monitor key OEF vulnerabilities related to liquidity mismatch.

Finally, the FSB will consider further promoting the use of fund- and system-level stress testing. The FSB will also promote the sharing of experiences on the design and use of such stress tests to inform vulnerabilities assessments and policy development.

2.3. Margining practices

Central counterparties (CCPs) functioned as intended during the March 2020 market turmoil, but the increases in margin requirements were sometimes significant in scale and frequency, in some cases stretching market participants' ability to manage the associated liquidity risk. In light of this, the BCBS, CPMI and IOSCO have conducted a review of margining practices in centrally

and non-centrally cleared markets.[11] The final version of this review, which incorporates feedback from consultation with industry,[12] was published in September 2022.[13]

Overall, the respondents viewed the consultative report as accurate, providing as it did a clear view of market events and margin dynamics during the COVID-19 turmoil. Respondents agreed that the relevant reforms enacted following the 2008 global financial crisis (GFC) enabled market participants to continue to transact in risk transfer markets during the COVID-19 turmoil. In particular, counterparty credit risk was mitigated by the greater use of CCPs and the implementation of non-centrally cleared margin rules. Most respondents noted that the report properly identified the main drivers for the increase in margin requirements and accurately assessed the preparedness of market participants to manage their liquidity requirements. In general, the responses also suggested that the report appropriately described the level of transparency, responsiveness and performance of CCP margin models as well as non-centrally cleared margin models and practices.

The BCBS, CPMI and IOSCO will work together and with the FSB, as part of its work programme on NBFI, to take forward the further work proposed in the consultative report, whose scope has been refined in light of the feedback received. This includes policy work on increasing transparency in centrally cleared markets; enhancing the liquidity preparedness of market participants as well as liquidity disclosures; identifying data gaps in regulatory reporting; streamlining variation margin processes in centrally and non-centrally cleared markets; and evaluating the responsiveness of both centrally cleared and non-centrally cleared initial margin models to market stresses (see section 4).

2.4. Liquidity, structure and resilience of core bond markets

The orderly functioning of core bond markets in normal and stress times is crucial for the proper functioning of the financial system. Corporate bond markets are an important part of the global capital markets and play a key role in financing the real economy. Government bond markets play a crucial role in financing government activities; as a 'safe haven' in periods of stress; as a benchmark for the pricing of other (risky) financial instruments; as a key collateral asset; and in capital and/or liquidity regulatory requirements for a number of financial institutions.

In many jurisdictions, the size of both corporate and government bond markets has increased considerably in recent years. Various factors have contributed to the growth of the corporate bond markets, including benign economic conditions driven by accommodative monetary policies, banking sector deleveraging, supportive tax treatment of debt over equity, and the increased role of some central banks in corporate bond markets. A similar trend, which

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11 This included a detailed consideration of the transparency of margining practices and the predictability and volatility of margin calls issued during the March 2020 market turmoil, across various markets, jurisdictions and margining models, as well as preparedness of market participants to meet margin calls, and the actions they took to do so. As part of this work, surveys were sent out to CCPs, intermediaries (including both banks and non-banks), clients and authorities to collect both quantitative and qualitative data. In total 69 CCP services, 63 intermediaries, 48 clients and 26 authorities provided responses.

12 Written feedback was received from 33 entities or groups, including CCPs or industry associations representing CCPs; clearing members or groups representing clearing members; clients or industry associations representing clients; and other entities, including academic institutions, consultancies, authorities and individuals. In addition to the written feedback, BCBS, CPMI and IOSCO held a series of virtual stakeholder outreach sessions in November 2021. Where respondents did not expressly request otherwise, the comments are available on the BIS and IOSCO websites.

13 See BCBS-CPMI-IOSCO (2022), *Review of margining practices*, September.

accelerated substantially as governments responded to the challenges posed by the COVID-19 pandemic, is present across government bond markets.

In March 2020, following the outbreak of the COVID-19 pandemic, many core bond markets experienced extreme dislocations and deteriorations in liquidity conditions. The FSB and IOSCO carried out work to analyse the liquidity, structure, and resilience of these markets.

In April 2022 IOSCO published a discussion paper on liquidity in corporate bond markets.[14] The paper concludes that although market dynamics are evolving with new entrants such as exchange-traded funds (ETFs) and increased electronification, corporate bond markets maintain a large institutional and buy-and-hold component and remain mostly reliant on a limited number of dealers for intermediation. The continued reliance on bilateral over the counter (OTC) dealer-intermediated trading also comes at a time when the liquidity supply by dealers is more constrained and less responsive to sudden increases in demand than before the GFC. Dealers are also committing less of their balance sheets to market-making activities. No single factor can explain dealer behaviour in March 2020, but a few factors do stand out, including large one-sided flows; internal risk appetite and management of balance sheet limits; and the extreme uncertainty that made risk management difficult. On the liquidity demand side, evidence on the influence of long-term investors during the stress period is mixed, while some OEFs contributed to selling pressure in some jurisdictions driven by investor redemptions.

There are currently limited alternative sources of liquidity, as well as challenges to improving market-making. These factors, taken together, mean that corporate bond markets may be unable to absorb significant and sudden increases in selling pressure, such as those experienced under market stress. IOSCO is scoping further work on possible ways to help improve market functioning and liquidity provision, such as assessing the feasibility, benefits and costs of mitigating shifts in liquidity demand and alleviating supply side market constraints.

In October 2022 the FSB published a report analysing liquidity in core government bond markets.[15] The report concludes that changes in core government bond markets over the past decade may have made these markets more prone to liquidity imbalances in times of stress. The growth in outstanding debt combined with the greater use of government bonds for trading strategies or liquidity management purposes may have increased sensitivity to shocks. Dealers have lower risk warehousing capacity to support intermediation compared with the size of trade flows especially in stress, while non-bank liquidity providers – such as principal trading firms – do not appear to materially increase market-making in stress.

The severe dislocations experienced in the government bond market during the March 2020 turmoil were the outcome of large spikes in the demand for liquidity by a variety of market participants, especially non-banks needing to raise cash to meet investor redemptions (such as OEFs and MMFs) or unwind leveraged positions (such as hedge funds). Unlike the typical case of being a ‘safe haven’ in periods of stress, this market experienced a ‘dash for cash’ as investors scrambled to sell highly liquid assets to fulfil their cash needs. This included sales of bonds to meet redemptions and/or margin calls, as well as to unwind leveraged positions.

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14 See IOSCO (2022), *Corporate Bond Markets – Drivers of Liquidity During COVID-19 Induced Market Stresses*, April.

15 See FSB (2022), *Liquidity in Core Government Bond Markets*, October.

Bank dealers increased their trading activities to some extent, but this was not enough to counterbalance selling pressures and avoid sharp movements in government bond prices and spreads. Dealers did not add to the selling pressure in a market that was already under considerable stress. Their stronger capital and liquidity positions as a result of the post-crisis reforms were a source of resilience during the stress. Based on available data, it appears that other liquidity providers did not sufficiently increase their intermediation activities.

Central bank interventions were fairly similar across jurisdictions and effective in alleviating market strains, highlighting the key role authorities can play in restoring market functioning in stress. The impact of interventions extended well beyond announcement effects. But these interventions are not without cost and should not substitute for the obligation of market participants to manage their own risks appropriately and self-insure against adverse outcomes. This underscores the need to address factors leading to large liquidity imbalances in stress.

The FSB report identifies policies to consider for enhancing the resilience of these markets, including measures to mitigate unexpected spikes in liquidity demand; enhance the resilience of liquidity supply in stress; and enhance risk monitoring and the preparedness of authorities and market participants. The report cautions that none of these policies is a silver bullet, but they could help mitigate the frequency and magnitude of liquidity imbalances in stress.

2.5. USD funding and external vulnerabilities in emerging market economies

The FSB, in collaboration with the IMF, examined the interaction between US dollar (USD) funding, external vulnerabilities, and NBFI financing in emerging market economies (EMEs).[16] Following the GFC, EMEs benefitted from strong capital inflows that also contributed to the build-up of vulnerabilities in terms of external borrowing and currency mismatches. Non-bank financial institutions played an increasing role in funding EME external debt. Part of this financing came from investment funds, whose assets more than tripled in this period. While this development added to the diversity of EME funding sources, it created new challenges for EMEs. Empirical evidence suggests that investment funds – especially those that are either passively managed or follow benchmark indices – may be more susceptible to global financial conditions, accentuating the procyclicality in capital flows.

The COVID-19 outbreak resulted in very large declines in asset prices in EMEs. Sales by foreign investors resulted in large-scale capital outflows in some jurisdictions and contributed to local currency depreciation. EM investment funds experienced substantial redemptions and empirical evidence indicates that funds holding more illiquid assets tended to experience larger outflows. Funds undertook sales of EME assets in response, with many bond funds selling more assets than was strictly needed to meet redemptions. Although this was likely a precautionary step in expectation of further withdrawals, the sales may have amplified the pressures in markets. Analysis suggests that jurisdictions which relied more on investment from global and passive bond funds tended to face greater capital outflows.

[16] See FSB (2022), *US Dollar Funding and Emerging Market Economy Vulnerabilities*, April.

Sovereign rating downgrades in the first half of 2020 may have added to the pressures at least in some jurisdictions that lost their investment grade rating, and so became ineligible for inclusion in some benchmark bond indices. EME companies with domestic credit ratings close to the sovereign rating were often downgraded shortly after the sovereign and this appeared to add to corporate borrowing costs.

EME authorities deployed a suite of measures to mitigate the pressures in local currency bond markets and to stem capital outflows during March 2020. These included standard crisis management tools, such as foreign exchange interventions and central bank liquidity support. A number of EM central banks, however, also introduced measures they had not used previously, such as large-scale asset purchases to mitigate stress in local currency debt markets. Actions by advanced economy (AE) authorities were also important in mitigating strains in financial markets globally and helped to address some of the pressures faced by EMEs. There were positive spillovers from measures directed at AE financial systems that helped to restore investor confidence more generally. In addition, some measures – notably USD liquidity swap lines and the Federal Reserve's FIMA repo facility – were more targeted at addressing global USD funding pressures, including those in EMEs.

The report notes that policies introduced after the GFC helped increase the resilience of the global banking system, including by strengthening capital and liquidity, which prevented banks from becoming an amplifier of the pandemic shock. It identifies policy measures to improve the resilience of EMEs' financial systems to future shocks by seeking to reduce EME vulnerabilities stemming from external funding and non-bank financing, as well as to enhance crisis management tools. The report notes that work to tackle NBFI vulnerabilities should remain a priority at the international level. Since EM funds located in AEs have an impact on markets and capital flows in EMEs in times of stress, any policy measures adopted for OEFs in AEs will have implications for EMEs as well. More generally, investors should continue to use due diligence with respect to their reliance on credit ratings, and there may be benefit in exploring how index providers could reduce their mechanistic use of credit ratings. Consideration should also be given to closing data gaps to facilitate risk monitoring and timely adoption of policies.

3. A systemic approach to NBFI resilience

3.1. The FSB framework and key amplifiers of liquidity stress

The FSB has been using the framework presented in last year's progress report in its assessment of the functioning and resilience of the NBFI ecosystem. The findings in specific areas described in the previous section underscore the need to focus on smoothing the spikes in the demand for liquidity and enhancing the resilience of its supply in stressed periods.

The work conducted this year augments the framework by identifying a set of activities and types of entities, or "key amplifiers", that may particularly contribute to aggregate liquidity imbalances and the transmission and amplification of shocks due to their size, structural characteristics and behaviour in stress. The NBFI sector is an ecosystem of diverse financial activities and types of entities closely interconnected among themselves and with the banking sector. However, some elements of this ecosystem are particularly susceptible to large swings in demand during stress

that are not matched by a sufficient increase in the supply of liquidity at the system-wide level, resulting in the propagation of shocks across markets.

On the liquidity demand side, this includes activities that give rise to **liquidity mismatches**. These are particularly prevalent in some types of non-bank entities, such as certain MMFs and OEFs, that may be forced to sell assets in response to redemptions and thereby cause or amplify liquidity strains in times of stress. In particular, as investors seek to get cash, funds that have a mismatch between their redemption terms and the time it takes to sell the underlying assets may experience substantial redemptions, particularly if they do not pass on fully the cost of selling those assets to exiting investors. To the extent that liquidity risk management tools do not sufficiently mitigate this first-mover advantage for exiting investors in a stress event, fund managers may be forced to sell assets that have limited liquidity at significant discounts and thus amplify the shock. Certain regulations and market practices may also create cliff effects that further encourage this type of pro-cyclical behaviour.[17]

Liquidity mismatches in other parts of the NBFI sector can also become key amplifiers of liquidity stress under particular circumstances. For example, insurance companies and pension funds are large holders of assets and could have significant effects on underlying markets depending on the nature and size of the shock. For instance, there is some evidence that in the UK, to meet margin calls on short foreign exchange positions in March 2020, domestic insurance companies and pension funds sold their GBP-denominated safe assets, thereby contributing to the yield spikes in their market.[18]

Another key amplifier may, in some circumstances, be unexpectedly large **margin calls** for derivatives and securities trades. While margin calls are a necessary protection against counterparty risk, they can result in an amplification of the demand for liquidity across markets and market participants if they are unexpected and affect a large enough part of the market. The BCBS, CPMI and IOSCO report found that in March 2020 the increase in margin calls impacted market participants differently depending on the size of market participants' positions (including the extent of their directional risk exposures) and level of liquidity preparedness, though market participants were overall able to meet margin calls.[19] A similar dynamic, but related to investment in UK government bonds, manifested in margin calls faced by UK pension funds using liability-driven investment strategies in September 2022.[20]

A third key amplifier is **mismatches associated with external funding and currency mismatches (e.g. considering the global use of the US dollar as a borrowing and**

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17 For instance, evidence suggests that those MMFs that were closer to breaching their weekly liquidity limits in March 2020 experienced larger redemptions as investors feared that the breach would have potentially resulted in the imposition of fees or gates by these funds. Similarly, the mechanistic reliance by some investors on external credit ratings (e.g. certain passive bond funds subject to index rebalancing) could result in large sales if a downgrade takes place, particularly from investment grade to high yield. Bonds issued by emerging market companies may be particularly susceptible to downgrades, given the existence of sovereign rating ceilings that constrain the ratings of many domestic issuers in those economies.

18 See Czech et al, An unintended consequence of holding dollar assets, Bank of England Staff Working Paper No. 953 (December 2021). On the other hand, there is some evidence in the US that life insurers did not sell their safe assets, and instead built up cash through bank loan advances and inflows of variation margin from their derivative positions. See Foley-Fisher et al, How Do U.S. Life Insurers Manage Liquidity in Times of Stress?, FEDS Note (August 2022).

19 See also Fache Rousová et al (2020), Interconnectedness of derivatives markets and money market funds through insurance corporations and pension funds, ECB Financial Stability Review, November.

20 See the letters by the Bank of England to the Chair of the Treasury Committee of the House of Commons on 5 October and 18 October 2022.

investment currency). In a global shock, such as the one experienced in March 2020, non-US entities (both private and public sector) may be unable to roll over US funding at a reasonable cost, and resort to selling their most liquid assets (including dollar-denominated assets) to raise cash, which can contribute to dislocations in some markets.

More generally, **leverage** can act as key amplifier, especially where it is not visible to market participant or authorities, as it can amplify and propagate shocks. For instance, hedge funds engage in highly leveraged trades and need to unwind those positions quickly when they can no longer meet margin calls from prime brokers or other counterparties. If this takes place while the market is already under stress, exiting positions may add to market volatility and result in a feedback loop that can affect other entities in the system, including banks. Leverage may be embedded in certain types of activities or be part of the strategy of specific entities. More work is needed to obtain a more complete picture of leverage in the NBFI ecosystem.

On the liquidity supply side, key amplifiers include factors that reduce the elasticity of liquidity provision in times of stress either because they unduly constrain liquidity providers or because they reduce the effectiveness of market functioning.

Liquidity providers may be unable to absorb large spikes in liquidity demand. Bank dealer balance sheets have not generally kept pace with the increase in the size of debt markets and dealers may be less willing to absorb risk and expand their market-making activities in stress. Market developments that reduced the risk-adjusted return of intermediation, post-crisis regulatory reforms to increase bank resilience (which proved successful during the pandemic), and broader changes in business models may have contributed to this outcome. The FSB's analysis suggests that bank dealers in March 2020, while playing a stabilising role, did not expand their intermediation sufficiently to meet large one-directional flows in stress. New players, such as principal trading firms (PTFs), have diversified liquidity provision in some markets in recent years, but they do not typically have the capacity or access to central bank financing to provide substantial amounts of liquidity in stress periods. As noted above, certain non-bank entities can be procyclical providers of liquidity due to their activities and underlying characteristics, switching from liquidity provision to demand in times of stress.

More generally, the **structure of core wholesale funding markets** continues to be characterised by limited standardisation, low levels of automated trading and turnover even in normal times, and heavy reliance on dealer intermediation. While there are historical reasons why these markets developed in this way, it is possible that their underlying structure contributes to amplifying stress as it may impede efficient use of liquidity that is potentially available to the market.

3.2. Key amplifiers in stress

3.2.1. March 2020 turmoil

In March 2020 many of the key amplifiers worked in tandem to transmit and amplify the shock across the NBFI ecosystem (see Graph 2 for a map of NBFI interconnectedness).[21] On the back

[21] See FSB (November 2020, op. cit.).

of continued bad news on the health and economic fronts, the flight to safety behaviour morphed into a broad-based dash for cash in mid-March, when even the safest and most highly liquid assets such as government bonds experienced large price decline. Increased demand for liquidity led to a surge in redemptions from non-public debt (prime) MMFs. This resulted in the selling of certain assets and shifts in the portfolios of those funds and contributed to the effective closure of the market for short-term funding and a sharp increase in demand for short-term government debt.

Some OEFs also experienced large redemptions, particularly those with a greater mismatch between their redemption terms and the liquidity of their underlying assets. Outflows from some EME and AEs' bond funds reached levels not seen at least since the 2008 financial crisis, both in terms of absolute amounts and as a percentage of assets under management. To meet redemption pressure, margin calls or build cash buffers, certain OEFs sold government bonds, contributing to a short period of illiquidity in these markets.

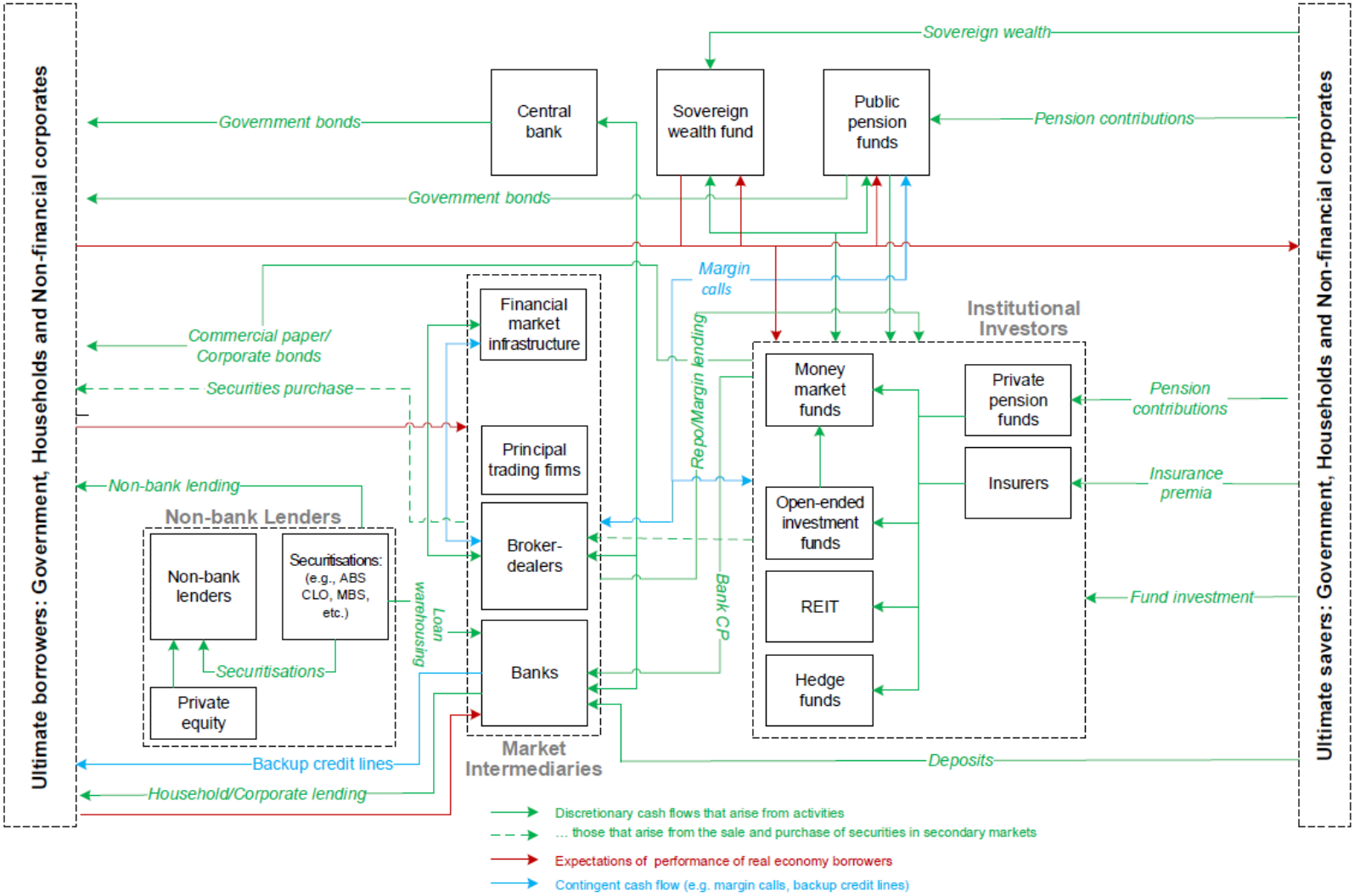
Margin calls contributed to the increased demand for cash. Initial margin calls for cleared derivatives experienced large increases in Q1 2020, as a result of the sharp rise in market volatility in March combined with increased transaction volumes and portfolio rebalancing. Variation margin calls were also sizable during March 2020.

Selling by foreign investors also added to market pressures. For example, foreign holders sold a record net amount of almost US$300 billion in Treasury bonds and bills in March 2020. This may have reflected efforts of EME authorities to raise USD cash to satisfy USD funding needs of non-US financial firms, or to intervene in foreign exchange markets. Large sales also came from international financial centres, where some leveraged non-bank investors are domiciled.

While dealers did not add to the selling pressure (unlike during the GFC), they were not able to meet the much higher liquidity demands and focused their market-making activities on a subset of securities. Notwithstanding their increased intermediation dealers were unable to prevent market dislocations and overall liquidity conditions from deteriorating given the very large amounts of selling by different market participants. While there is limited information on the behaviour of other liquidity providers such as PTFs, available evidence suggests that – in the markets where they are active – they did not sufficiently increase their intermediation activities to meet increased demand for intermediation.

NBFI interconnectedness

Graph 2



3.2.2. Leverage in the Archegos case

The importance of leverage as a key amplifier was highlighted by the recent failure of Archegos Capital Management (Archegos), a US-based family office. From late 2020 to default, Archegos exposures grew exponentially to a gross market value of $163 billion, predominantly by using equity derivatives financed by global banks.[22] On 26 March 2021 Archegos was unable to pay margin calls to a number of its prime brokers. Archegos obtained its leverage through the use of derivatives, principally total return swaps (TRSs) and contracts for difference on equities. In March 2021 sharp declines in the price of some securities to which Archegos was exposed triggered prime broker margin calls it failed to meet. Archegos' counterparties sought to reduce their exposures following its failure by selling securities they had used to hedge their derivative exposures. Doing so resulted in further changes in price, which themselves prompted further prime broker margin calls and deleveraging.

The opacity of family offices makes it hard to compare Archegos's leverage to that of other financial institutions in the same sector. Archegos's gross notional derivatives exposure was around five times the value of its equity prior to its failure; this level of leverage is larger than that typical of hedge funds employing similar equity strategies, but not abnormally so.

However, leverage was compounded by the size and very high concentration level of Archegos's positions to a small group of equity issuers. Archegos's prime brokers appear to have held between 5% and 45% of the outstanding securities across eight equities to which Archegos was exposed. These represented up to eighteen times the average daily traded volume in some cases. Hence, there appear to have been deficiencies in risk management of a number of prime brokers providing credit to Archegos (including inadequate margining practices) and issues with their due diligence, governance, business strategies and organisational structures.

The liquidation of these positions over a short period of time had a significant impact on market prices, including for some of Archegos's prime brokers, highlighting the potential amplification effect of leverage across securities markets (see Graph 3). However, major equity and credit indices were broadly unaffected. While the impact of Archegos's failure remained contained, losses from such concentrated exposures could have spilled over to other markets and potentially raised concerns as to certain banks' soundness.[23] They therefore raise the question of why such concentrated exposures went undetected. One answer is that these positions were opaque to authorities and to prime brokers (who were only aware of the credit they were providing). For instance, although transaction reporting is now required in the US, at the time TRS contracts used by Archegos to obtain leveraged exposure to certain equities were not subject to these requirements.[24] In other jurisdictions, relevant transactions were generally only subject to reporting if the counterparties were located in those jurisdictions.

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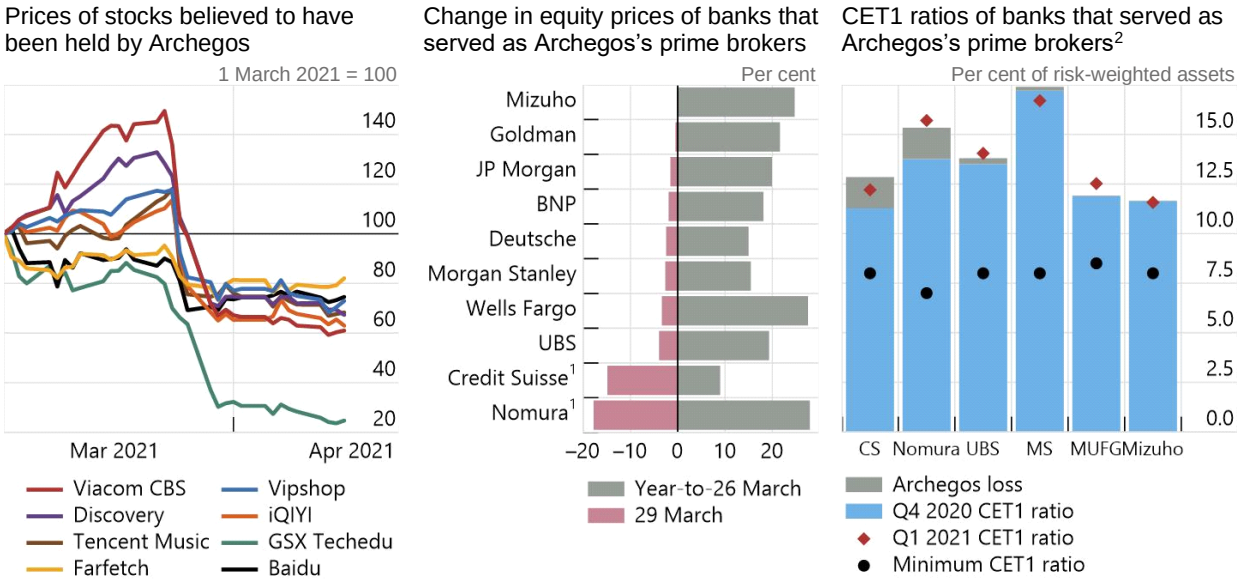
[22] Archegos took long exposures to a small number of individual companies, and hedged these with short positions on equity indices. In doing so it aimed to be market neutral, i.e. profit from changes in the price of securities versus the broader indices.

[23] Similar concerns about the transmission and amplification of losses from highly leveraged positions through derivatives manifested in the past for the hedge fund Long-Term Capital Management in 1998 and for AIG in 2008.

[24] Since 8 November 2021, security-based swaps in the US have been required to be reported to security-based swap trade repositories. Public dissemination of transaction information has been required since February 2022.

In sum, the combination of leverage and the fact that it was not transparent to credit providers and market regulators highlighted its potential role in amplifying shocks. In the Archegos case, prime brokers' capital was sufficient to absorb their counterparty credit losses (in excess of $10 billion) without compromising their ability to support the financial system or real economy, but the combination of leverage and opacity may not always result in such outcomes.

The effects of Archegos's failure **Graph 3**



[1] Nomura and Credit Suisse announced on 29 March 2021 that they were facing significant losses from their exposures to Archegos and these losses were subsequently confirmed; other banks that provided prime brokerage services to Archegos exited their position without significant losses. [2] The height of the bars shows the CET1 ratio in Q4 2020. The impact of Archegos is the reported loss divided by risk-weighted assets. The minimum CET1 ratio includes the capital conservation buffer and G-SIB buffer, but not the counter-cyclical capital buffer or any Pillar II additions.

Sources: Bloomberg; Datastream; FSB calculations.

4. Policies to address systemic risk in NBFI

This section describes a set of policy proposals to address systemic risk in NBFI, focusing on key amplifiers described in section 3 that may contribute to liquidity imbalances in aggregate. These proposals form the basis for follow-up detailed work by the FSB and SSBs to revise or add to their existing international standards or to provide more guidance as needed.

4.1. Assessing the existing policy toolkit

There is a well-established and diverse set of policy tools for NBFI. Assessing whether this policy toolkit is adequate and effective from a system-wide perspective involves mapping existing tools to the key amplifiers; examining the extent to which these tools have been or could be used to contain the build-up of liquidity imbalances; and exploring whether some of these tools can be redeployed (e.g. in terms of design or use) to close gaps or address vulnerabilities that could give rise to system-wide liquidity imbalances.

To this end, the FSB conducted a stocktake on the availability and main features of existing policy tools in FSB jurisdictions as well as the experience in their use to date to address systemic

risks in NBFI.[25] The exercise confirmed that there is a broad range of micro-prudential and investor protection tools potentially available to mitigate systemic risks for the identified key amplifiers.[26] Nevertheless, the design, calibration and use of several of these tools – particularly LMTs for MMFs and OEFs as well as margin requirements for centrally cleared and non-centrally cleared securities and derivatives markets – is generally the responsibility of market participants based on the regulations and under the supervision of authorities. In situations where private incentives and financial stability goals are not adequately aligned, the availability of these tools may not by itself be sufficient to effectively address systemic risks.

Many of the existing tools for MMFs are the result of reforms introduced after the 2008 financial crisis. In a number of jurisdictions these reforms resulted in the creation of MMFs with different restrictions on the types of assets they can invest in.[27] Other policy tools include liquidity requirements for MMF portfolios and the option for MMF managers to introduce liquidity fees and suspend redemptions, although these latter tools are almost never used in practice.

With respect to addressing liquidity mismatch in OEFs, a number of LMTs are available in most FSB member jurisdictions. Some are aimed at increasing the liquidity of portfolio assets, including limits on investment in illiquid assets and on asset concentration. Other commonly available tools impose costs on investors that redeem shares or restrict the liquidity funds offer to investors, including redemption fees and the suspension of redemptions. Other tools available in some jurisdictions include liquidity buffers, redemption gates and swing pricing. The primary purpose of many existing tools is to ensure an appropriate degree of protection for investors, rather than to mitigate vulnerabilities that could give rise to financial instability. These tools are typically calibrated and activated by fund managers rather than by regulators.

Margin requirements are widely used, implemented on an ongoing basis and have the primary objective to ensure prudent risk management and mitigate systemic risk. Their application differs between centrally cleared and non-centrally cleared markets. For centrally cleared markets, the entities responsible for the design and calibration of margins are CCPs in accordance with the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMI) and subject to supervisory review or approval. Under the PFMI, CCPs are expected – to the extent practicable and prudent – to limit the need for destabilising, procyclical changes in initial margin.[28] In non-centrally cleared markets, it is the responsibility of the various counterparties (subject to supervisory review or approval) to determine margins to mitigate counterparty credit risk. While international

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25 The scope of the exercise covered the policy tools in the FSB Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities (August 2013) and certain other tools that have been relevant in the March 2020 market turmoil (e.g. margin requirements in centrally and non-centrally cleared derivatives and securities markets). The information covered the availability of a tool in each jurisdiction; its primary purpose; the entity responsible for the design/calibration and activation of the tool; the entities covered; as well as the timing (i.e. whether on an ongoing basis or only in stress), conditions (if any) and extent of the use of the tool (i.e. whether it has been used in practice).

26 The stocktake exercise did not include other policy tools that could be considered in certain jurisdictions to address systemic risks in NBFI. These include prudential rules for banks; powers of designation of systemically important non-banks; and authority by financial stability bodies in certain jurisdictions to adopt certain macroprudential tools or to make recommendations to regulatory authorities to apply new or heightened standards and safeguards.

27 In the EU, for example, MMFs are split into 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; and VNAV MMFs which have a variable NAV. Similarly, in the US, funds that invest substantially in non-government securities, such as commercial paper, and that are sold to institutional investors, must have a variable NAV. See FSB (2021), *Policy proposals to enhance money market fund resilience: Final report*, October.

28 PFMI Principle 6, Key Consideration 3. See the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMI).

standards exist for non-centrally cleared derivatives, there are none for non-centrally cleared securities.[29]

Restrictions on the amount of leverage are applicable across most NBFI entities, including OEFs. These mainly involve limits on balance sheet leverage and apply on an ongoing basis. However, these tools do not typically capture certain types of off-balance sheet or synthetic leverage through (for example) repo and derivatives positions. In such cases, other tools – such as margin requirements or counterparty credit risk standards – often provide the main way to address the build-up of leverage.

Policy tools for other parts of the NBFI ecosystem[30] are mostly micro-prudential in nature and apply on an ongoing basis. They include capital and liquidity requirements, limits on large exposures, and restrictions on the scope of certain activities. Supervisory authorities are often responsible for the calibration and use of these tools.

A set of policy tools common to all non-bank financial entities is public disclosure requirements. These vary extensively given the broad range of NBFI activities and entities.[31] By closing data gaps, transparency measures can foster price discovery, mitigate information asymmetries and help anchor investor expectations, including during stress. They can also support the effective use of policy tools across different NBFI segments.[32]

Experience with the use of NBFI policy tools for systemic risk mitigation is limited, with the March 2020 experience providing lessons about their potential use and effectiveness. But several of these tools could potentially be re-purposed for systemic risk mitigation (in addition to their other functions) with appropriate modifications to their design and use. For instance, as noted below, more detailed international guidance could be provided regarding how LMTs should be properly calibrated to ensure that investors bear the costs of liquidity associated with fund redemptions; and how authorities can ensure that centrally and non-centrally cleared margin practices avoid excessively procyclical responses to different types of market stresses.

4.2. Policy proposals

Policies to address systemic risks in NBFI should aim to reduce liquidity demand spikes; enhance the resilience of liquidity supply in stress; and enhance risk monitoring and the preparedness of authorities and market participants. These policies, described below, include revising or adding to existing international standards by the FSB and SSBs or providing further guidance as needed; identifying other potentially useful policy options that individual authorities

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29 In March 2020, while both centrally and non-centrally cleared markets saw comparable increases in volatility, the corresponding adjustment in initial requirements for non-centrally cleared derivatives was much smaller, due primarily to the low responsiveness to volatility changes of the standardised model developed by ISDA.

30 This includes entities classified under economic functions 2-5 of the 2013 FSB Policy Framework. These cover entities that provide lending dependent on short-term funding (e.g. finance companies); intermediate market activities dependent on short-term funding (e.g. broker-dealers); facilitate credit intermediation (e.g. financial guarantors); and are involved in securitisation-based credit intermediation (e.g. structured finance vehicles and trust companies).

31 One of the overarching principles of the 2013 FSB Policy Framework states that authorities should enhance disclosure by other non-bank financial entities as necessary to help market participants understand the extent of risks posed by such entities.

32 See, for example, section 5 and Box 5 in the FSB report on Policy proposals to enhance money market fund resilience (October 2021); and section 4 and Box 3 in the FSB (2016), *Thematic Review on the Implementation of the FSB Policy Framework for Shadow Banking Entities*, May.

may wish to consider based on their particular market structure and context; and carrying out additional analytical work to assess and, as appropriate, address issues identified in the NBFI work to date. Any changes to international standards or guidance will involve close coordination between relevant SSBs and outreach with stakeholders to assess their potential impact, including a public consultation.

The policy proposals outlined below involve largely repurposing existing policy tools rather than creating new ones, given the extensive policy toolkit already available. The proposals aim to close the gaps identified in the analyses by the FSB and SSBs in a proportionate manner, i.e. aiming to address identified vulnerabilities without unduly reducing non-bank entities' ability to perform their core economic functions. The main focus of the proposals is to reduce excessive spikes in the demand for liquidity, either by addressing the underlying vulnerabilities that drive those spikes (e.g. by reducing liquidity mismatch or the build-up of leverage) or by mitigating their financial stability impact (e.g. by ensuring that redeeming investors pay the cost of liquidity and by enhancing the liquidity preparedness of market participants). Policies to enhance the resilience of liquidity provision in stress are also very important, though they are more difficult to implement as they require longer-term changes to market structure; tend to be country- and context-specific; and are subject to clear limits on the ability of market intermediaries to absorb large one-directional flows in stress.

As noted above, experience with the use of existing NBFI policy tools for systemic risk mitigation is limited to date. The FSB will assess in due course whether the repurposing of these tools is sufficient to address systemic risks in NBFI, including whether there is a need to develop additional tools for use by authorities.[33]

Complementing these policy proposals is work on operational considerations for effective central bank interventions to address market dysfunction in exceptional circumstances. Such interventions were effective in alleviating market strains in previous cases, including in March 2020, highlighting the key role authorities can play in restoring market functioning in stress. But these interventions are not without cost, as they can distort market mechanisms and incentives and lead to moral hazard; they may also pose risks to taxpayers' funds. These interventions should therefore not substitute for the obligation of market participants to manage their own risks appropriately and self-insure against adverse outcomes. The key overarching principle for central bank interventions aimed at restoring market functioning is that they should act as backstops.[34] This may be particularly relevant from a forward-looking perspective, as the current macroeconomic environment makes it more difficult for central banks to intervene if significant liquidity imbalances arise, which further underscores the need to enhance the resilience of the NBFI sector through the policies described below.

4.2.1. Policies to reduce spikes in demand for liquidity

As noted in section 3, certain types of non-bank entities may be particularly susceptible to spikes in liquidity demand during stress due to their structural characteristics (e.g. liquidity mismatch)

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33 In the FSB's stocktake, a few member authorities mentioned other policy tools that could be considered to address systemic risks in NBFI. These include, for example, the authority by financial stability bodies in their jurisdiction to adopt certain macroprudential tools or make recommendations to regulatory authorities to apply new or heightened standards and safeguards.

34 See BIS Markets Committee (2022), *Markets disfunctions and central bank tool*s, May.

and types of activities (e.g. use of leverage and margining). Reducing such spikes therefore involves policies that seek to alter those characteristics (e.g. through measures to reduce liquidity mismatch or the build-up of leverage) or to mitigate first-mover advantages (e.g. through the use of tools that pass on the cost of liquidity to redeeming investors).

As mentioned above, the FSB, in collaboration with IOSCO, has already published policy proposals to enhance the resilience of **money market funds** through mechanisms to impose on redeeming fund investors the cost of their redemptions; to absorb losses; to address regulatory thresholds that may give rise to cliff effects; and to reduce liquidity transformation. In terms of next steps, the FSB, working with IOSCO, will carry out a stocktake by the end of 2023 of the MMF reform measures adopted or planned by FSB member jurisdictions, including their evidence-based explanation of relevant MMF vulnerabilities and policy choices made.

While the FSB effectiveness assessment suggests that the 2017 FSB policy recommendations to address structural vulnerabilities stemming from liquidity mismatch in **open-ended funds** remain broadly appropriate, enhancing clarity and specificity on the intended policy outcomes would make them more effective from a financial stability perspective. To this end, the FSB and IOSCO will carry out follow-up policy work through (see section 2.2. for more details):

- Revisions to the 2017 FSB Recommendations to address structural liquidity mismatch and promote greater inclusion and use of liquidity management tools as well as to clarify the appropriate roles of fund managers and authorities in implementing these recommendations. This work would aim to: provide greater clarity on the redemption terms that OEFs could offer to investors based on the liquidity of their asset holdings; promote greater inclusion of anti-dilution LMTs (such as swing pricing and anti-dilution levies) aimed at passing on explicit and implicit costs of redemptions (including any significant market impact of asset sales) to redeeming investors in OEF constitutional documents; and encourage greater use, and greater consistency in the use, of these tools in normal and stressed market conditions, including to avoid any threshold effects.

- Operationalisation of the revised FSB Recommendations through amendments to the 2018 IOSCO Recommendations and supporting good practices.

- Development of detailed IOSCO guidance on LMTs to complement the revised FSB Recommendations. This would include identifying the factors that managers should consider in employing anti-dilution LMTs to impose the explicit and implicit costs of redemptions on redeeming investors in both normal and stressed market conditions.

- Enhancement of the availability of OEF-related data for financial stability monitoring. This work would seek to close identified data gaps relating to OEF liquidity mismatch, the use of LMTs, and attendant financial stability risks.

- Sharing of experiences among authorities on the design and use of fund- and system-level stress tests to support OEF liquidity risk management and inform vulnerabilities assessments and policy development.

The FSB and IOSCO will monitor progress by member jurisdictions in implementing their respective revised Recommendations. This monitoring will be followed up, once implementation

is sufficiently advanced, with an assessment of effectiveness of jurisdictions' policy measures in addressing risks to financial stability from OEF liquidity mismatch.

With respect to **margining practices**, as noted in section 2.3, further work in view of potential international policy consideration will be carried out by the BCBS, CPMI and IOSCO together and with the FSB in the following areas:[35]

- Increasing transparency in centrally cleared markets, through work to explore consistent metrics and disclosures concerning procyclicality, responsiveness to volatility and model performance; the provision of tools and simulators; and disclosure of modelling choices by individual CCPs.

- Enhancing liquidity preparedness of market participants as well as liquidity disclosures, including through appropriate liquidity measures in the NBFI sector, and ways that clearing members can encourage and facilitate greater preparedness of clients.

- Identifying data gaps in regulatory reporting, which could provide a more comprehensive picture of the preparedness of market participants for margin calls.

- Streamlining variation margin (VM) processes in centrally and non-centrally cleared markets, to foster market participants' preparedness for the large VM calls that can occur during market stress through efficient collection and distribution.

- Evaluating the responsiveness of centrally cleared initial margin (IM) models to market stresses, with a focus on impacts and implications for CCP resources and the wider financial system. This includes exploring appropriate expectations as to procyclicality in various settings, and reviewing the effectiveness of tools that lessen the procyclicality of margin and the consistency of the tools' use.

- Evaluating the responsiveness of non-centrally cleared IM models to market stresses. This includes the timeliness of mechanisms for taking into account stress periods in the calibration of internal models, as well as the timely remediation of IM shortfalls and the level of disclosure regarding the performance of non-centrally cleared IM models.

With respect to the role of **leverage** as a key amplifier of liquidity imbalances, the FSB intends to carry out additional work in 2023 to assess and, where necessary, take policy action to address this vulnerability. The main focus will be on issues related to "hidden" leverage in NBFI,[36] particularly prime brokerage and hedge funds/family offices, to assess vulnerabilities and transmission channels from these activities, their financing sources and interconnections between non-bank leveraged investors and banks; and to address, as appropriate, vulnerabilities identified in the bond market liquidity work or the Archegos case.[37] Other relevant work underway or planned by the FSB focuses on vulnerabilities from specific instruments or

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35 See BCBS, CPMI and IOSCO (September 2022, op.cit.).

36 Hidden leverage refers to instances where the presence/magnitude of leverage in the financial system is not easy to monitor, either because no data are available (e.g. because it accumulates outside the regulatory perimeter) or because reported data are not sufficient or in a form that facilitates the assessment of vulnerabilities by authorities or market participants.

37 Measures to limit the build-up of leverage by non-bank investors include the use of prudent margin and haircut practices for bilateral transactions and the adoption of sound risk management practices by the providers of financing to those investors.

markets where leverage acts as a shock amplifier and could affect financial stability, e.g. with respect to leveraged loans, liability-driven investing by pension funds, collateralised loan obligations and commodities markets.[38] IOSCO is also collecting aggregated fund leverage data and assessing leverage trends in asset management.

4.2.2. Policies to enhance the resilience of liquidity supply in stress

The elasticity of supply of liquidity is now more limited than in the past (see section 2.4). In part this is due to the increase in the size of bond markets coupled with reduced balance sheet capacity of bank dealers to support intermediation compared with the size of trade flows. The FSB's analysis suggests that bank dealers in March 2020, while playing a stabilising role, did not expand their market-making activities sufficiently to meet large one-sided flows. Other liquidity providers do not appear to sufficiently increase their market-making in stress.

Higher capital and liquidity requirements since the 2008 financial crisis ensured that banks could absorb the COVID shock rather than amplify it through deleveraging. At the same time, **prudential requirements** could in some cases affect how dealers manage their balance sheets and may make them less willing to use them, including in stress periods. The FSB report on liquidity in core government bond markets finds that prudential constraints were not reported to be a primary driver of the behaviour of bank dealers, but may have had an impact at the margin and in a subset of the markets.[39]

The BCBS is evaluating the effectiveness of Basel III reforms, and will consider, if necessary, any additional measures relating to prudential treatment of banks with a view to safeguarding the resilience and agreed prudential standards of the global banking system.[40] The BCBS recently published a report examining the usability of buffers and the cyclicality of the Basel III framework.[41] The report finds, among others, little evidence to suggest that reluctance by banks to use liquid asset buffers has affected their lending and market activity, given the short-lived nature of the liquidity pressures during the pandemic.

The FSB report on USD funding and external vulnerabilities in EMEs[42] notes that some measures have already been undertaken by authorities in FSB member jurisdictions to enhance the supply of liquidity in stress.[43] The report also proposes a number of policy measures that seek to reduce EME vulnerabilities stemming from external funding and non-bank financing, as

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38 The FSB is also implementing its 2013 policy recommendation to collect and aggregate data on securities financing transactions (SFTs) at global level, which can be used to monitor build-up of leverage and financial system interconnections through SFTs.

39 The factors reported as most relevant for dealer behaviour in March 2020 were the high level of uncertainty caused by the pandemic, large one-sided flows, and the internal risk management of dealers. See FSB (October 2022, op. cit.). Similar conclusions were reached by IOSCO in its work on corporate bond markets.

40 Any further potential adjustments to Basel III will be limited in nature and consistent with the Committee's evaluation work. See the 30 November 2020 press release by the Group of Central Bank Governors and Heads of Supervision (GHOS), the oversight body of the Basel Committee on Banking Supervision.

41 See BCBS (2022), *Buffer usability and cyclicality in the Basel framework*, October. Another BCBS evaluation report focusing more broadly on the impact of the introduction of implemented Basel III reforms on bank resilience is planned for publication towards end-2022.

42 See FSB (April 2022, op. cit.).

43 For instance, the US Federal Reserve transformed the foreign and international monetary authorities (FIMA) repo facility it had established in March 2020 into a standing facility in 2021. Transactions using this facility allow approved FIMA account holders to temporarily exchange their Treasury securities for US dollars, which can then be made available to institutions in their jurisdictions. This measure, along with the liquidity swap lines provided to a number of central banks by the US Federal Reserve and the ECB, is intended to ease funding strains particularly for EMEs.

well as to enhance crisis management tools. These include measures to limit the build-up of non-financial corporate foreign currency mismatches; further development of foreign currency hedging markets at the domestic and regional levels to manage currency risks; deepening of local currency debt markets and foster a broader domestic investor base; and tackling NBFI vulnerabilities, including those relating to liquidity mismatches in OEFs.

In addition, it should be noted some of the policies aiming to reduce excessive spikes in the demand for liquidity outlined above, may also support the provision of liquidity during stress episodes – for example, by reducing the observed procyclicality in liquidity provision by some non-bank market participants and (through lower one-sided flows) modifying the relative risk-return trade-off for more stable liquidity providers to continue to intermediate in times of stress.

To enhance the resilience of liquidity supply in stress, individual authorities may wish to explore additional **reforms to domestic government and corporate bond markets** as follows:[44]

- ways to increase the availability and use of central clearing for government bond cash and (especially) repo transactions;
- the use of all-to-all trading platforms to encourage a more diverse set of participants, including new players that can potentially provide investors with more options to access market liquidity without solely relying on dealer intermediation; and
- measures to enhance the transparency of bond and repo markets (both pre- and post-trade), including through regulatory reporting of transaction data such as on the identity and activities of participants in those markets.

These policy options involve a number of policy trade-offs, so their scope, incentives and modalities need to be considered and tailored for the specific market structure and context. For example, central clearing can provide greater transparency of counterparty risks and risk reduction through netting of exposures, but it can also increase costs for market participants and, absent a clearing mandate, they may therefore not be incentivised to use it even when it is available; the resilience benefits of expanding the use of all-to-all platforms depend on whether non-banks would be a stable source of liquidity in stress, which is not a given; while more timely and accurate information on bond and repo market transactions may affect different participants' incentives to trade. As these policies take time to design and implement, authorities need to consider how they could potentially be combined to increase the resilience of their domestic markets.

In terms of further work on market structure and liquidity provision, the FSB and IOSCO will carry out follow-up work in 2023, complementing MMF policy reforms, to enhance the functioning and resilience of short-term funding markets. The FSB and IOSCO will also consider additional work in due course to enhance the resilience of liquidity provision in core bond markets.

[44] See FSB (October 2022, op. cit.) and IOSCO (April 2022, op. cit.).

4.2.3. Measures to strengthen the monitoring of systemic risks in NBFI

The FSB will enhance its ongoing monitoring of systemic risks in NBFI by drawing on the findings and methods in the various workstreams. In addition to the measures described above to address existing gaps in reporting and disclosures on OEFs and margining practices, as well as to consider ways to enhance the transparency of bond and repo markets, the FSB will:

- Develop additional metrics to monitor NBFI vulnerabilities (e.g. on liquidity mismatch in OEFs) and use tools such as interconnectedness maps and sector-wide liquidity stress tests (where available) in its surveillance work.
- Enhance its analysis of specific vulnerabilities in NBFI through targeted deep dives, focusing initially on hidden leverage (as described above).
- Integrate findings from work on the use of already available data (e.g. in trade repositories) for monitoring systemic risk.

The FSB will report on its assessment through regular communication channels (e.g. Annual Report, Global Monitoring Report on NBFI) and ad-hoc publications on deep-dive analyses.

5. Way forward

To further advance on the design and implementation of policies to address systemic risks in NBFI discussed in the previous section, the FSB will continue its work programme in 2023. This work will be carried out within the FSB as well as by its member SSBs and international organisations, to ensure that relevant experiences and perspectives are brought to bear. The deliverables include stand-alone reports in specific areas of the programme and an overall progress report to the G20 in late 2023 with the main findings across different areas and any further policy proposals to address systemic risks in NBFI. Table 1 in the Executive Summary provides an overview of the work programme on NBFI for 2023 and beyond, while Table 2 describes the work that has already been completed.