FSB FINANCIAL STABILITY BOARD

Enhancing the Resilience of Non-Bank Financial Intermediation

Progress report

1 November 2021

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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). NBFI has grown considerably over the past decade – to almost half of global financial assets – and become more diverse. As a result, the importance of NBFI for the real economy has increased and is likely to continue to grow.

The March 2020 turmoil has underscored the need to strengthen resilience in the NBFI sector. Some parts of the financial system, particularly banks and financial market infrastructures, were able to absorb rather than amplify the macroeconomic shock, supported by the post-crisis reforms. However, key funding markets experienced acute stress and public authorities needed to take a wide range of measures to support the supply of credit to the real economy.

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. Building on the lessons from the March 2020 market turmoil, the FSB's NBFI work programme includes analytical and policy work to examine and, where appropriate, address specific issues that contributed to amplification of the shock; enhancing understanding and strengthening the monitoring of systemic risks in NBFI; and assessing policies to address systemic risks in NBFI.

The more prominent role of debt markets and NBFI has made funding and market liquidity more central to the capacity of the NBFI sector, and the financial system at large, to absorb shocks of different types. Large shifts in the demand for, and supply of, liquidity may result in liquidity imbalances, for instance as market participants seek to increase cash holdings while at the same time liquidity supply may decline due to deleveraging and reduction of market making services. If such imbalances become sufficiently pervasive, deteriorating liquidity conditions may create risks to financial stability.

Changes to the financial system over the past decade have resulted in shifts to both the demand and supply of liquidity, as well as changes to their sensitivity to a given shock. On the one hand, the demand for liquidity has increased as the size of debt markets and the importance of investors offering liquidity on demand have grown. This growth may have been sustained by the low interest rate environment and other factors that have encouraged debt accumulation and a search for yield by investors. On the other hand, the supply of market liquidity by banks – which continue to play a critical role in core funding markets – has not kept pace with this increase. 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. Moreover, while new players have diversified liquidity provision in some markets in recent years, they have only limited incentives to intermediate in stress. The combination of these factors implies potentially larger swings in liquidity needs for a shock of a given size. In addition, greater interconnectedness among market participants has accentuated liquidity imbalances transmitted through different parts of the system.

The availability of liquidity and its effective intermediation under stressed market conditions is a key determinant of the functioning and resilience of the NBFI ecosystem. Efficient and resilient market-based intermediation depends on the ability of market participants to manage risks

efficiently and minimise market dislocations when adjusting their portfolios. These dislocations become more likely in the case of large imbalances between liquidity supply and demand. NBFI resilience therefore depends on the behaviour of different types of entities in the NBFI ecosystem as well as on the infrastructure and activities that connect those entities together, and with other parts of the financial system.

The main focus of work to date has been on assessing and addressing vulnerabilities in specific areas that may have contributed to the build-up of liquidity imbalances and their amplification. This includes policy work to enhance MMF resilience; work to assess liquidity risk and its management in open-ended funds (OEFs); work to examine the structure and drivers of liquidity in core bond markets during stress; an examination of the frameworks and dynamics of margin calls in centrally cleared and non-centrally cleared derivatives and securities markets; and an assessment of the fragilities in USD cross-border funding and their interaction with vulnerabilities in emerging market economies (EMEs).

Building on the findings in the first part, the second part of the FSB's work programme aims to develop a systemic approach to NBFI. It involves enhancing the understanding of systemic risks in NBFI to strengthen their ongoing monitoring; and, where appropriate, developing policies to address such risks, including by assessing the adequacy of current policy tools given the desired level of resilience for the sector.

Efforts to develop a systemic approach to NBFI can build on existing work. The work in specific areas under the NBFI work programme to date has helped to deepen the understanding of vulnerabilities in particular NBFI activities and entities, including their implications for system-wide liquidity risk conditions. Many of these vulnerabilities had already been identified in previous work, and frameworks and tools have been developed by securities markets regulators to address them. However, enhancing the understanding of systemic risk in NBFI and developing policies to address such risk needs to take explicit account of the lessons from the March 2020 turmoil, including the increased importance of assessing interconnections.

Understanding systemic risks in NBFI involves analysis of the interaction and propagation of risks from a system-wide perspective. Conceptually, such a system-wide perspective would combine: (i) an assessment of potential vulnerabilities and the resulting liquidity demands under stress across different non-bank financial institutions and markets; (ii) the identification and quantification of the main interconnections that propagate liquidity imbalances across the global financial system; and (iii) an assessment of the potential interaction of vulnerabilities and interconnections, and their implications for the liquidity of core markets that underpin the functioning of the global financial system. This approach provides the flexibility to analyse new market developments and emerging risks from a system-wide perspective.

Policies to address systemic risk in NBFI will have to take into account the heterogeneity of the sector and the fact that there is already a well-established and diverse set of policy tools for NBFI. The focus of policy work is to ensure that the toolkit is adequate and effective from a system-wide perspective, drawing on the lessons from the March 2020 market turmoil. Types of policies that could be considered include measures to: mitigate unexpected and significant shifts in liquidity demand; enhance the resilience of liquidity supply in stress; and enhance risk monitoring and preparedness of authorities and market participants. International cooperation and coordination on policies is necessary given the cross-border nature of NBFI.

Table 1 summarises the FSB's work programme on NBFI for 2022 and beyond.

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	Policy proposals for enhancing MMF resilience	Completed
	Follow-up deliverables:	
	FSB, working with IOSCO, to take stock of the MMF policy measures adopted by FSB member jurisdictions, and assess their effectiveness in addressing risks to financial stability	End-2023 and 2026 respectively
	IOSCO to revisit its *Policy Recommendations for MMFs* in light of the framework and policy toolkit in FSB report	TBD
	FSB and IOSCO to carry out follow-up work to enhance the functioning and resilience of short-term funding markets	TBD
Liquidity risk and its management in open-ended funds (OEFs)	IOSCO to review implementation of its 2018 Liquidity Risk Management Recommendations in OEFs and FSB to assess and report on the effectiveness of its 2017 recommendations on liquidity mismatch in OEFs from a financial stability perspective, based on a coordinated analytical framework	Mid-2022
Margining practices	BCBS-CPMI-IOSCO consultation report on margin calls in centrally cleared and non-centrally cleared derivatives and securities markets and liquidity management preparedness of market participants	Completed
	BCBS-CPMI-IOSCO to prepare final report	2022H1
	FSB and relevant SSBs to carry out potential follow-up work based on the final report (see Box 1 for details)	2022H2 and beyond
Liquidity, structure and resilience of core bond markets	Findings and policy implications, including with respect to the role of dealers and non-bank leveraged investors in these markets, to be included in NBFI progress report (see below)	Underway, to be completed by mid-2022
USD funding and EME vulnerabilities	FSB to prepare report on fragilities in USD cross-border funding and their interaction with vulnerabilities in EMEs	2022Q2 (G20 deliverable)
Developing a systemic risk perspective in NBFI	FSB, with involvement from SSBs, to organise conference on systemic risks and policies to address them in NBFI	2022H1
	FSB to assess vulnerabilities in NBFI and report on implementation of G20 NBFI reforms (in Annual Report)	2022Q4
	FSB to publish a revamped Global Monitoring Report for 2022 reflecting the findings from NBFI work	2022Q4
Developing policies to address systemic risk in NBFI	FSB to publish report with main findings of NBFI initiatives and policy proposals to address systemic risk in NBFI	2022Q4 (G20 deliverable)

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.

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. Underlying drivers for this growth include long-term demographic trends leading to asset accumulation; macro-financial factors such as accommodative monetary policies; rising valuations; and 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 March 2020 turmoil has underscored the need to strengthen resilience in the NBFI sector.[1] Some parts of the financial system, particularly banks and financial market infrastructures, were able to absorb rather than amplify the macroeconomic shock, supported by the post-crisis reforms. However, key funding markets experienced acute stress and public authorities needed to take a wide range of measures to support the supply of credit to the real economy. The breadth and dynamics of the economic shock and related liquidity stress in March 2020 were unprecedented. This episode has highlighted issues associated with particular market activities and mechanisms that caused systemic liquidity imbalances and propagated stress. Absent significant interventions by central banks and other authorities to stabilise funding markets, it is likely that the stress in the financial system would have worsened significantly. The exceptional measures taken 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 FSB is coordinating work to enhance the resilience of the NBFI sector while preserving its benefits. Its NBFI work programme builds on the lessons from the March market turmoil and includes analytical and policy work to examine and, where appropriate, address specific issues that contributed to amplification of the shock; enhancing understanding and strengthening the monitoring of systemic risks in NBFI; and assessing policies to address systemic risks in NBFI (see below). 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. These efforts should not compromise the resilience in other parts of the system or the important role that NBFI plays in financing the real economy.

The rest of the document is structured as follows:

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

- Section 2 provides an overview of the NBFI ecosystem, describes how large liquidity imbalances may be created that give rise to financial stability risks, and explains how the FSB's work programme aims to enhance resilience in this sector;
- Section 3 presents the main findings of the work thus far to assess and address vulnerabilities in particular NBFI entities and activities;
- Section 4 describes initial considerations and policy implications in developing a systemic risk perspective on NBFI; and
- Section 5 describes the focus of the 2022 work programme.

2. A framework for enhancing NBFI resilience

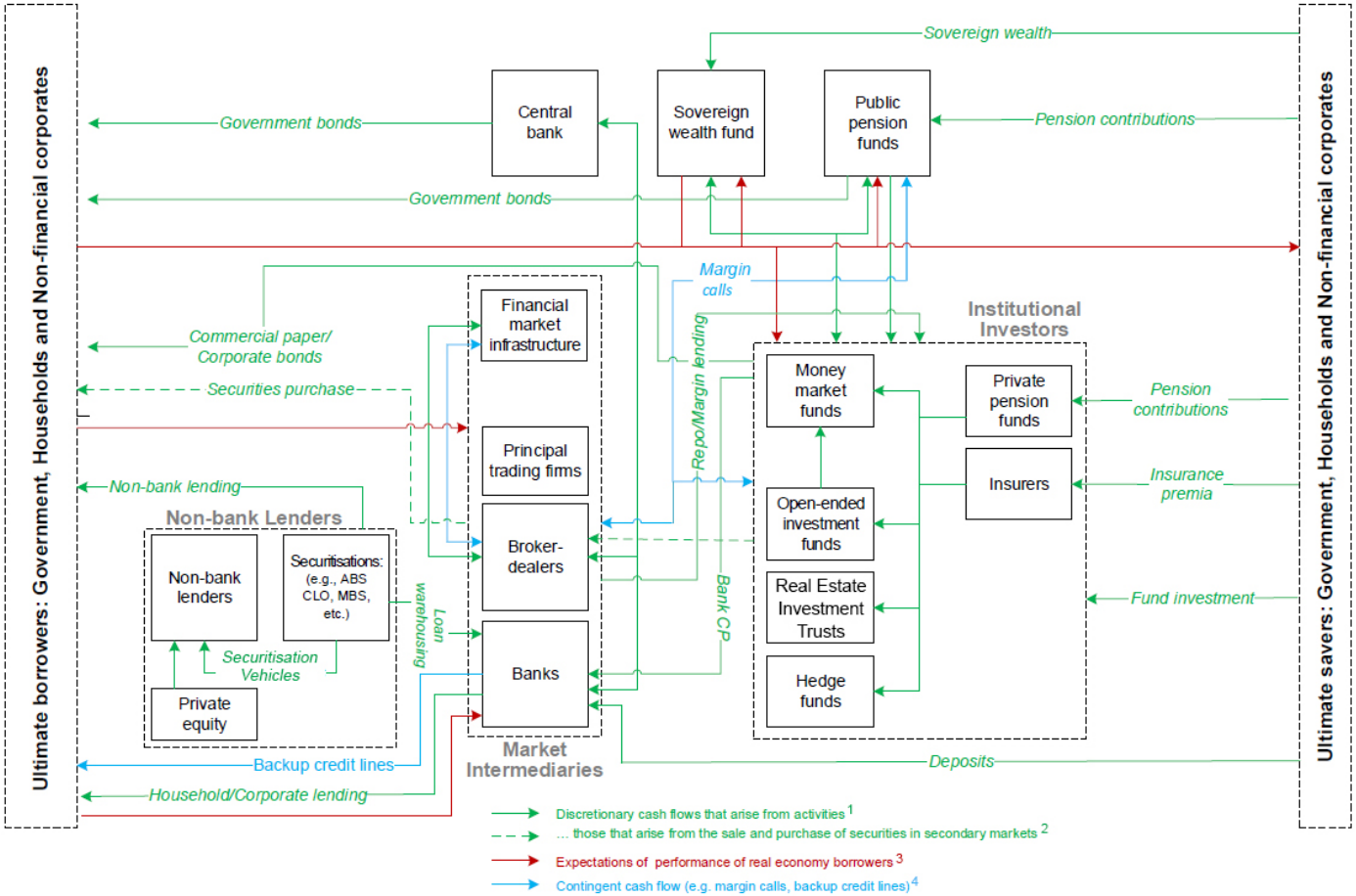
Resilience refers to the capacity of the NBFI sector, and the financial system at large, to absorb shocks of different types.[2] In contrast to the 2008 financial crisis, the COVID-19 shock originated outside the financial system. Irrespective of the source of the shock, the global financial system should be able to withstand it and continue to supply financial services to support the real economy. Enhanced resilience does not rule out the possibility of jurisdictions' public interventions if the shock is extreme and leads to disruptions in the provision of financial services that are severe enough to adversely impact the real economy. But such interventions should take place in extraordinary situations rather than becoming embedded in expectations of market participants, as this would lead to moral hazard and distort markets.

NBFI resilience depends on the behaviour of different types of entities in the NBFI ecosystem as well as on the infrastructure and activities that connect those entities together, and with other parts of the financial system. In the case of NBFI, its diverse nature and complexity as well as its links with the banking sector and the real economy (see below) make the assessment of resilience particularly challenging, given that shocks may propagate in unexpected ways. Relevant factors include not only the types of exposures and potential vulnerabilities of individual entities or the risk profile of particular activities, but also market practices, incentive structures, behavioural responses and the interplay between different parts of the financial system under stress.

[2] For a discussion of the relationship between resilience and financial stability, see the FSB Financial Stability Surveillance Framework (September 2021).

A stylised schematic of the NBFI ecosystem and its interconnections

Graph 1



Notes: [1] Discretionary cash flows that arise from activities: cash-flows that are voluntary at inception - in the sense that they are instigated at the discretion of market participants (e.g. a decision to purchase an insurance product). The direction of these green arrows depicts the direction of the cash payment made at the inception of these transactions (e.g. payment of bond principal, insurance premia). [2] Discretionary cash flows that arise from purchase/sales: cash flows that arise when market participants transact in secondary markets. [3] Expectations of performance…: These lines depict the deterioration of expectations of the performance of real economy borrowers on the part of institutional investors, ultimate savers, and some market intermediaries due to changes in the external environment which can give rise to a reversal of normal-times cash flows. [4] Contingent cash flows: payments that are mandatory from the perspective of the payee, such as margin calls or fund redemptions.

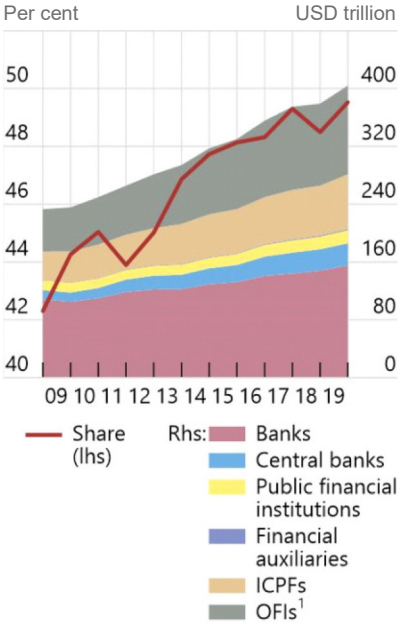
2.1. The NBFI ecosystem

The NBFI ecosystem comprises a diverse set of financial activities, entities and infrastructures interconnected among themselves, to the banking sector and to the broader economy (see Graph 1).[3] Non-bank financial institutions – comprising investment funds, insurance companies, pension funds and other financial intermediaries – have different business models, balance sheets and governance structures, and are subject to distinct regulatory frameworks within and across jurisdictions.

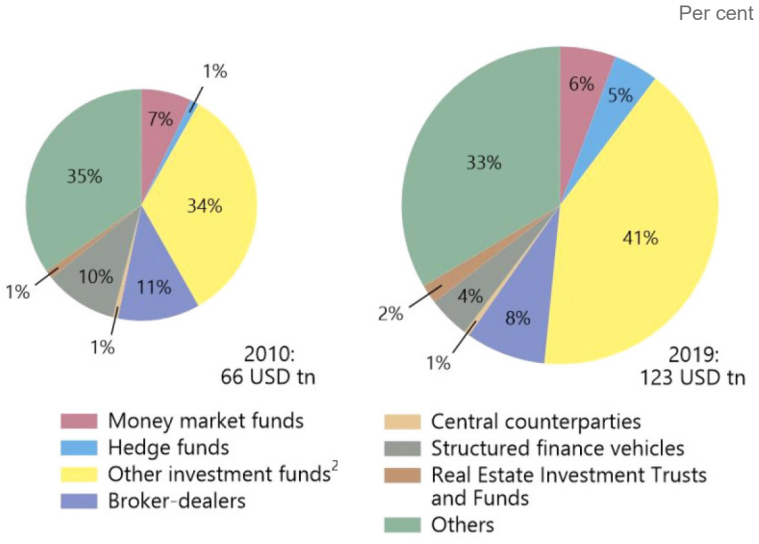
Over the past decade, business models in, and financial services provided by the NBFI sector have become more diverse. New types of markets (e.g. private debt) and forms of intermediation (e.g. FinTech credit) have sprung up; while investments in credit products (e.g. through fixed income exchange-traded funds and collateralised loan obligations) and participation in certain credit segments (e.g. mortgage and consumer finance, leveraged loans) by non-banks has grown. Overall, the structure of the NBFI sector has changed considerably over the past decade (see Graph 2).

The NBFI sector has grown and evolved considerably in recent years **Graph 2**

NBFI asset's rising share in total financial assets



Share of OFI's major subsectors to total OFI assets



ICPFs = Insurance corporations and Pension funds; OFIs = other financial intermediaries. Data used in the charts above covers 21 jurisdictions and euro area.

[1] OFIs (other financial intermediaries) are 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] Investment funds other than MMFs and hedge funds.

Source: FSB Global Monitoring Report on Non-Bank Financial Intermediation 2020, FSB calculations.

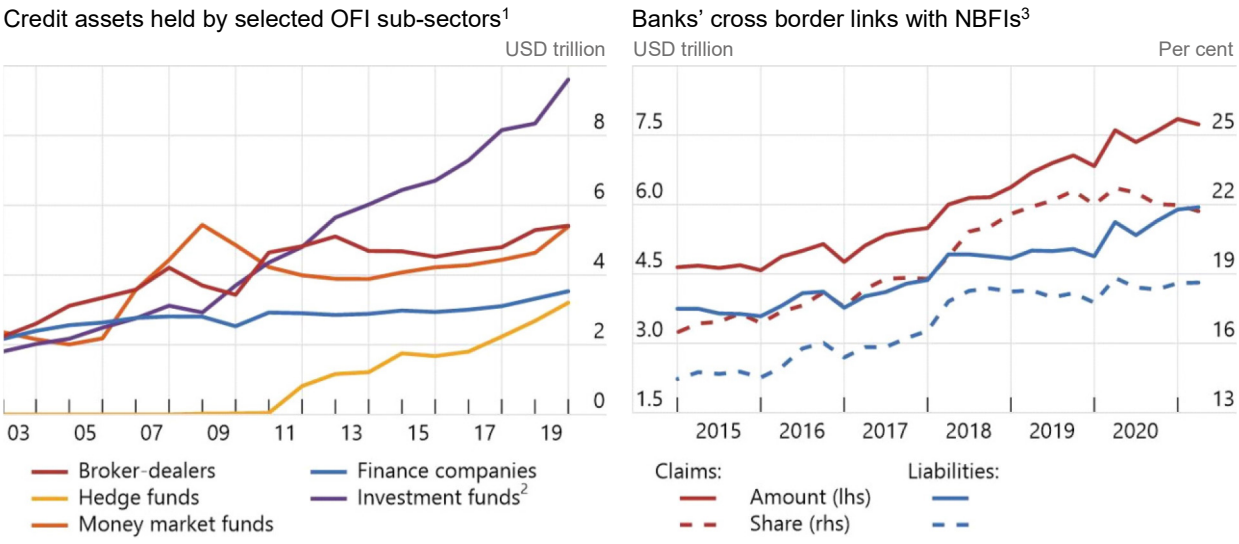
Non-bank financial institutions, especially investment funds and their asset managers, play an increasingly important role in financing the real economy and in managing the savings of

[3] See the FSB's *Global Monitoring Report on Non-Bank Financial Intermediation 2020* (December 2020).

households and corporates. Reflecting this greater role, credit assets held by investment funds have risen steadily over the past ten years (see Graph 3, left-hand panel). More generally, NBFI institutions provide wider access to financing and investment opportunities, specialised risk management and risk sharing services (e.g. through derivatives hedging and treasury management), and efficient delivery (e.g. through payment, clearing, settlement and electronic trading infrastructures).

NBFI interconnectedness has grown over the past decade, including on a cross-border basis (see Graph 3, right-hand panel). Linkages with banks take different forms – funding connections (including through repo markets and backup lines of credit), investments in bank-issued instruments by non-bank entities, ownership links, and reliance on bank dealers for market intermediation. Moreover, cross-border links with banks and non-bank institutions have increased, due to the use of the US dollar as a funding and investment currency. Financial centres and large advanced economies play a prominent role, as hosts of the largest and most interconnected non-bank financial institutions.[4] An increasing number of these entities, in particular asset managers, are offering products, raising funds and channelling investments outside their home market. A consequence of these trends is that non-bank financial institutions have become more interconnected and also dependent on US dollar funding, while having less recourse to funding sources such as central bank facilities.

Non-bank financial institutions provide more credit and are more interconnected with banks **Graph 3**



[1] Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level. [2] Investment funds other than MMFs and hedge funds. [3] Based on a varying number of reporting countries in respective quarters.

Source: BIS locational banking statistics; FSB Global Monitoring Report on Non-Bank Financial Intermediation 2020; FSB calculations.

The increased use of central counterparties (CCPs) and the introduction of bilateral margining for OTC derivatives products has mitigated counterparty credit risks in the financial system. To achieve this risk mitigation, market participants need to be prepared to meet margin calls on time, by holding sufficient funds and highly liquid non-cash assets of good credit quality.[5] The

4 See *Cross-border links between banks and non-bank financial institutions* by Aldasoro et al (BIS Quarterly Review, September 2020).

5 Variation margin (VM) is usually met in cash while initial margin (IM) can be met in both cash and eligible non-cash assets.

effectiveness of margin tools in enhancing resilience of the system therefore depends on market participants' ability to anticipate, measure, prepare for, and meet margin calls in both normal times and periods of market stress.

The growth of NBFI implies that risks are increasingly being intermediated and held outside the banking sector, with implications for global financial system resilience. A shift from the traditional model where banks keep credit risk on their balance sheets to a model where it is borne by end-investors, and traded in financial markets, means that financial resilience tends to depend less directly on bank buffers and more on the ability of investors to effectively manage market, credit and liquidity risk in times of stress. This in turn implies greater reliance on market liquidity and price signals for managing portfolios and the associated risks.

2.2. The need for liquidity and its availability in stress

The availability of liquidity and its effective intermediation under stressed market conditions is a key determinant of the functioning and resilience of the NBFI ecosystem. Efficient and resilient market-based intermediation depends on the ability of market participants to manage risks efficiently and minimise market dislocations when adjusting their portfolios. These dislocations become more likely in the case of large imbalances between liquidity supply and demand. The interaction of a shock with existing financial vulnerabilities[6] – including liquidity and maturity mismatches, as well as high leverage – may lead to sudden and large shifts in the demand for, and supply of, liquidity.[7] Liquidity demand may increase as market participants seek to increase cash holdings while at the same time liquidity supply may decline due to deleveraging and reduction of market making services. If the resulting liquidity imbalances become sufficiently pervasive, deteriorating liquidity conditions may create risks to financial stability.

Changes to the financial system over the past decade have resulted in shifts to both the demand and supply of liquidity, as well as changes to their sensitivity in a given shock. On the one hand, the demand for liquidity has increased as the size of debt markets and the importance of investors (such as funds) offering liquidity on demand has grown. This growth may have been sustained by the low interest rate environment and other factors (e.g. tax treatment) that have encouraged debt accumulation and a search for yield by investors. On the other hand, the supply of market liquidity by banks – which continue to play a critical role in core funding markets – has not kept pace with this increase (see below). The combination of these factors implies potentially larger swings in liquidity needs for a shock of a given size. In addition, the greater interconnectedness among market participants described above has accentuated market stress through different parts of the system.

Large and unexpected liquidity demands in the NBFI sector may stem from various factors. One such factor is liquidity mismatch at the level of individual entities, for example the difference between fund redemption terms and the time it can take the fund to sell the underlying assets. This liquidity mismatch exposes those funds to the risk of sudden and disruptive redemptions, as investors' needs may be hard to predict (as was the case in March 2020 due to the pandemic). To the extent that redemption costs are not fully passed on to existing fund investors, this may

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6 A financial vulnerability reflects the accumulation of imbalances; may increase the likelihood of a shock; and when acted upon by a shock, may lead to systemic disruption. See the FSB Financial Stability Surveillance Framework (ibid).

7 This was the case in the 'dash for cash' episode in mid-March 2020. See the FSB's Holistic Review of the March Market Turmoil (ibid) for details.

contribute to a first-mover advantage for such investors in a stress event and thus increase the level of redemptions. Another factor is market activities that can give rise to unexpectedly large liquidity needs in stress. For instance, the practice of requiring margin for derivatives trades, while acting as a safety buffer for counterparty risk, can result in large and unexpected demands for liquidity across market participants.

The providers of liquidity may be unable to absorb these increases in liquidity demands. As noted above, bank balance sheets have not generally kept pace with the increase in the size of debt markets and associated liquidity demands. Dealers may be less willing to absorb risk and expand their market-making activities in stress in certain markets. 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. As seen in March 2020, bank dealers are unlikely to expand their intermediation sufficiently to meet large one-directional flows in stress. While new players have diversified liquidity provision in some markets in recent years, they do not typically have access to central bank financing and have only limited incentives to intermediate in stress. More generally, core wholesale funding markets continue to be characterised by limited standardisation, low levels of automated trading and turnover even in normal times, and heavy reliance on dealer intermediation.

The interaction of large swings in demand and insufficient supply of liquidity at the system-wide level can result in fire sales, thereby amplifying the effects of the shock. Interconnections among different types of market participants could propagate shocks in ways that are difficult to predict ex ante. Fire sales could be the result of various dynamics:

- One example is first-mover advantages arising from liquidity mismatches in some types of investment vehicles, combined with challenges in selling assets during stress. To the extent that liquidity risk management tools do not sufficiently mitigate first-mover advantages that exacerbate redemption pressures, fund managers may be forced to sell assets that have limited liquidity at significant discounts. If funds hold similar portfolios in such instruments, this may further hamper their simultaneous selling.

- Another example is the behaviour of leveraged investors in stress. Such investors tend to respond more strongly to adverse shocks as they may need to unwind their positions quickly to raise cash. If this takes place while the market is already under stress, exiting positions may add to market volatility and result in a negative feedback loop.

- Sudden and large margin calls from derivatives and securities positions are another potential source of amplification, as they can lead to a redistribution of liquidity across the financial system. If investors are faced with margin calls in amounts that exceed their expectations (e.g. due to higher margin requirements for a given level of market volatility, or lack of preparedness for increases in margin requirements in stress), their liquidity demands may add to pressures for asset sales.

- Certain regulations and market practices may create cliff effects that further encourage pro-cyclical behaviour. 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.

- The increased use of market-based USD funding by corporates outside the US may also add to stress dynamics. For example, during the March 2020 market turmoil, severe strains in offshore dollar funding markets emerged, as non-US corporates were unable to roll over funding at a reasonable cost. Efforts by these corporates and their domestic authorities to raise USD cash by selling their most liquid dollar-denominated assets may have contributed to dislocations in some markets (e.g. US Treasuries).

Conjunctural factors may also contribute to the severity of market dynamics in response to a shock. In particular, low interest rates and high levels of corporate indebtedness over the past decade have meant that firms became increasingly exposed to the risk of a material economic downturn or an unexpected rise in rates. At the same time, investors became more susceptible to sudden shifts in market sentiment and a tightening of financial conditions in response to shocks.

If not properly managed, liquidity imbalances may give rise to financial stability concerns. This is because the resulting fire sales of financial assets impact the provision of financing or other critical services to the economy (e.g. because of market dislocation) or result in the transmission of stress to other parts of the financial system, including systemically important financial institutions (contagion). In such tail events, public interventions may occur to maintain financial stability by restoring market functioning and confidence. However, such interventions can have undesirable effects as they may lead to market distortions and introduce moral hazard if they become embedded in the expectations of market participants.

2.3. Liquidity imbalances and the NBFI work programme

The FSB's work programme on NBFI aims to better understand the drivers and prevent the build-up of liquidity imbalances that would result in system-wide stress. The programme has two main parts.

The first part, which has been the main focus of work to date, aims to assess and address vulnerabilities in specific areas that may have contributed to the build-up of liquidity imbalances and their amplification (see section 3). This comprises:

- Policy work to enhance MMF resilience, including with respect to the appropriate structure of the sector and of underlying short-term funding markets.

- Work to assess liquidity risk and its management in open-ended funds (OEFs), in particular the redemption pressures faced by such funds in March 2020 and their drivers; the availability and effectiveness of liquidity risk management tools; and the extent to which fund vulnerabilities impacted the financial system and wider economy.

- Work to examine the structure and drivers of liquidity in core government and corporate bond markets during stress, including the role and behaviour of different market participants (including dealers) during March 2020 and the drivers of their behaviour.

- An examination of the frameworks and dynamics of margin calls in centrally cleared and non-centrally cleared derivatives and securities markets, and the liquidity management preparedness of market participants to meet margin calls.

- An assessment of the fragilities in USD cross-border funding and their interaction with vulnerabilities in EMEs.

Building on the findings in the first part, the second part of the FSB's work programme aims to develop a systemic approach to NBFI. It involves enhancing the understanding of systemic risks in NBFI to strengthen their ongoing monitoring; and, where appropriate, developing policies to address such risks, including by assessing the adequacy of current policy tools given the desired level of resilience for the sector.

3. Work progress in assessing and addressing vulnerabilities in specific areas

3.1. Enhancing money market fund (MMF) resilience

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

The secondary markets for the underlying short-term instruments in which MMFs invest are typically not very active and therefore the supply of liquidity is limited. Dealers help issuers sell their paper to investors, including MMFs, and provide other services to those issuers. However, dealers typically are not active in making secondary markets for commercial paper (CP) and negotiable certificates of deposit (CD). Investors, including MMFs, tend to buy and hold these instruments to maturity and often reinvest the proceeds of maturing assets in the obligations of the same issuers. As a result, trades in the secondary market are less common, and there is limited demand for dealer intermediation services even under normal market conditions. Moreover, dealers have limited economic incentives to make markets in these short-dated instruments. Instead, they tend to limit their activities to the primary market and occasionally buy back paper that they originally placed in response to requests from their clients, although dealers are under no contractual obligation to do so.

The FSB published its final report with policy proposals to enhance MMF resilience.[8] The report considers the likely effects of a broad range of policy options to address MMF vulnerabilities, by examining how these options would affect the behaviour of MMF investors, fund managers and sponsors, as well as the options' broader effects on short-term funding markets, including through impacts on the use of potential substitutes for MMFs. Policy options are grouped

8 See *Policy Proposals to Enhance Money Market Fund Resilience: Final Report* (October 2021).

according to the main – though not necessarily the only – mechanism through which they aim to enhance MMF resilience. Representative options under each mechanism include: swing pricing or economically equivalent measures (to impose on redeeming investors the cost of their redemptions); minimum balance at risk and a capital buffer (to absorb losses); removal of ties between regulatory thresholds and imposition of fees/gates and removal of the stable net asset value (to reduce threshold effects); and limits on eligible assets and additional liquidity requirements and escalation procedures (to reduce liquidity transformation). Other options that are variants of the representative options are also presented in the report.

FSB members are assessing, or will assess, 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. In addition, the FSB will, working with IOSCO, review progress made by member jurisdictions in adopting reforms to enhance MMF resilience. The review process involves a stocktake to be completed by the end of 2023 of the measures adopted by FSB member jurisdictions, to be followed by 2026 with an assessment of the effectiveness of these measures in addressing risks to financial stability. IOSCO also plans to revisit its 2012 *Policy Recommendations for Money Market Funds* in light of the framework and policy toolkit in the report. Finally, in response to the feedback from the public consultation, the FSB and IOSCO intend to carry out follow-up work, complementing MMF policy reforms, to enhance the functioning and resilience of short-term funding markets.

3.2. Liquidity risk and its management in OEFs

In March 2020, many OEFs faced liquidity pressures, dealing with large outflows and deterioration in market liquidity. Some fixed income OEFs, in particular corporate bond funds, experienced large outflows in nearly all jurisdictions, triggered by the flight to safety and 'dash for cash'. Overall OEFs experienced only modest levels of fund suspensions, which were restricted mainly to those funds invested in real estate. Fund managers actively managed their liquidity risk and decided how best to meet investor redemptions through the use of cash, the sale of underlying assets and the deployment of LMTs. At the same time, OEFs' sales of assets to meet redemptions may have produced negative spillovers. OEFs holding corporate bonds in particular, along with other market participants, sold assets into markets with deteriorating liquidity and hence may have added to existing selling pressure. Central bank intervention and government and regulatory action stabilised and restored confidence in markets, reducing investor redemption and selling pressures from OEFs and other market participants.

The FSB's 2017 report[9] and some studies suggest that vulnerabilities can arise from liquidity mismatches in some OEFs. In stressed market conditions, investors might have an additional incentive to redeem if they expect to receive funds that exceed the value of their claims on underlying portfolio assets. To the extent that proper valuation or liquidity management tools (LMTs) do not remove this expectation, this first mover advantage could enable redeeming investors to benefit at the expense of remaining investors. In addition, in stress, as some assets become harder to value, the reported net asset value of the fund may incorporate stale asset prices which have not been adjusted to their implied market value, adding to incentives to redeem fund shares. Lastly, as outflows increase, managers need to decide whether to sell

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

assets and/or build up cash to meet future redemptions. This approach, albeit a rational portfolio management decision, could have implications for financial stability by adding to selling pressures in stressed markets.

While the dash-for-cash was the main driver of OEF redemptions and manager decisions to sell assets in March 2020, determining the materiality and economic impact of the liquidity mismatch vulnerability in contributing to the market stress is difficult. This is due to lack of sufficient data and methodological challenges in isolating excess redemptions caused by liquidity mismatch versus redemptions caused by other drivers during the March 2020 stress. Although it is difficult to directly observe the vulnerability arising from liquidity mismatch, some external analysis of the March 2020 market turmoil (which may be subject to methodological and data limitations) links a substantial proportion of outflows from US corporate bond OEFs to liquidity mismatch. Furthermore, to the extent that OEFs were not able to meet redemptions through new inflows or free cash flow, there is evidence that some funds deployed a horizontal slicing approach – selling the most liquid assets and using cash first. This may have helped funds to meet redemptions and proved less costly in the short-term. Managers may have also decided to take this approach to strategically rebalance their portfolio or to take advantage of short-term opportunities. However, this approach would have increased the liquidity mismatch for OEFs with existing low levels of cash or less liquid portfolio holdings had the stress endured for longer. Other OEFs deployed a vertical slicing approach – selling a pro-rata representative slice of assets to maintain the shape of the portfolio.

Swing pricing and other LMTs may have helped to reduce liquidity mismatches and reduce first mover advantages. The use of swing pricing increased in March 2020 and larger swing factors were generally observed. However, such LMTs were not used consistently within or across jurisdictions and evidence of their effect on fund outflows is inconclusive.[10] Swing pricing is not currently available or used in all jurisdictions. Some jurisdictions do permit other anti-dilution measures that seek to achieve the same economic effect.

On spillovers, there is also evidence that asset sales by OEFs and other market participants contributed to stress in certain underlying markets. For example, based on one study, to meet redemptions US OEFs first sold US Treasuries, which are generally more liquid. US OEFs were the second largest sellers of Treasuries in March 2020, not far behind the aggregate sales of overseas central banks, governments and hedge funds. While evidence on spillovers to corporate bond markets is mixed, work looking at the March 2020 turmoil found evidence that US OEFs' asset sales led to further reductions in corporate bond prices. The scale of any spillovers from OEFs will depend on the size and scale of the vulnerability and relative importance of OEFs in the underlying asset markets. Spillovers may also be present within the fund industry due to interfund lending and borrowing from affiliates. However, there is little evidence that OEFs used interfund lending significantly during March 2020.

This analysis will inform additional work being conducted by the FSB and its members. The work includes IOSCO's review of the implementation of its 2018 *Recommendations on Liquidity Risk Management for OEFs* and the FSB's assessment of its 2017 *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*, which are planned for

[10] For example, swing factors differed markedly across UK funds with similar exposures.

2022. These two exercises, which will be based on a coordinated analytical framework, will assess the effectiveness of existing policy recommendations to mitigate vulnerabilities in OEFs and their impact on the broader economy, and could facilitate the development of further policy recommendations, where appropriate, to mitigate liquidity mismatches and improve liquidity management tools. Additional work may also be undertaken to further assess the economic significance and materiality of the impact of OEF vulnerabilities on underlying asset markets to support IOSCO's review and the FSB's assessment.

3.3. Margining practices

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 challenging market participants' ability to manage the associated liquidity risk. In light of this, the CPMI, IOSCO and the BCBS set out to conduct a review of margining practices in centrally and non-centrally cleared markets.[11] An analysis of the collected information has fed into a consultation report, published in October 2021.[12]

CCPs mitigated counterparty credit risk by transferring VM as prices fluctuated – these flows were large, but mechanical in tandem with underlying market volatility. CCPs also generally increased IM requirements – again by design, though the amount of IM calls was large.[13] Peaks in centrally cleared VM calls (which reached $140bn on 9 March 2020) were around 5-6 times larger than the pre-stress average and almost twice as large as the peak IM call during the same period. Peaks in centrally cleared IM calls were more than 20 times larger than the pre-stress average and were more frequent. This difference is partly because IM typically does not change substantially during normal times, while VM calls can be sizable even during non-stress times.

Market participants were generally able to meet increased margin calls successfully, though some of them may not have adequately planned for a shock of such amplitude. Most intermediaries did not experience material issues converting high quality liquid assets (HQLA) into cash, though some changed their investment strategies (e.g. reducing the volume and tenor of money market placements and non-HQLA securities). However, survey responses suggest that there was significant heterogeneity in clients' indicated level of preparedness for margin calls, sometimes due to a lack of use of information or simulation tools provided by CCPs and clearing members or by lack of availability of such tools. The overall demand for cash and other high-quality assets rapidly increased during this period as market participants sought collateral to satisfy all of their obligations, including margin requirements, settlement payments and redemptions from funds.

Analysis suggests that there were cases where IM changes were not sufficiently predictable which, when combined with insufficient preparedness of some market participants, can amplify

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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 See the BCBS-CPMI-IOSCO *Consultative report: Review of margining practices* (October 2021).

13 In March 2020, total IM across CCPs globally increased roughly by $300bn or 40% relative to the average in February 2020.

market stress. This suggests the need to ensure adequate transparency into IM dynamics and modelling choices – which could include forward-looking (predictive) and backward-looking (performance) disclosures, as well as more sophisticated tools/simulators – and governance practices as well as adequate preparedness of market participants for increased margin requirements during these periods. CCPs provide information via their public disclosures and share margin simulators with market participants to enable them to anticipate, and prepare for, IM changes. However, clients' responses to the survey suggest that transparency into potential IM changes varies across CCPs and jurisdictions, and that overall transparency could be improved.

There was also significant dispersion in the increases in IM requirements across and within asset classes, with the majority of the increase driven by the core component of models. Much of this dispersion appears to be driven both by dispersion in price volatility and CCP margin models' response to this volatility, with the largest IM changes in markets that saw the largest volatility spikes. By contrast, changes in volumes and risk positions played a smaller role. An analysis of key IM model parameters highlights differences across a number of model components across CCPs. Reactivity to volatility increases was not linear across asset classes or within an asset class, which may be explained by, for example, differing CCP model components and implementations, product features, or portfolio composition.

Many CCPs make use of anti-procyclicality measures, which can moderate increases in IM during periods of high volatility. Generally, large margin rate or portfolio IM increases accompanied large volatility increases in underlying markets. A closer look at changes in daily price volatility of the largest risk factors for CCPs, and changes in margin rates and IM increases, suggests that margin rate and IM increases did not move one-for-one with (indeed, were less than) the corresponding increases in the price volatility of key risk factors for CCPs. Further work would be needed to better understand the impact, costs and benefits associated with the speed and size of margin increases relative to underlying market movements leading up to and during March 2020, as well as to develop frameworks to better understand procyclicality.

Non-centrally cleared derivatives markets saw similar levels of volatility in key underlying risk factors, but comparatively limited increases in IM. The nature of the ISDA Standard Initial Margin Model (SIMM)[14] means the IM requirements it calculates do not react in parallel to realised and real-time volatility. This also suggests that IM requirements on non-centrally cleared transactions may be less reactive to short-term increases in market volatility. However, reactivity is not the only characteristic of margin models, and a comparison of cleared and non-centrally cleared margin performance would require more in-depth analysis.

Further to the analysis of margining practices during the March 2020 market turmoil, the BCBS, CPMI, IOSCO are consulting on potential areas for further work, which may inform policy consideration. This includes ways market participants can enhance their liquidity preparedness as well as liquidity disclosures, and consideration of margining practices in centrally and non-centrally cleared markets (see Box 1 for details).

[14] The SIMM model is an industry-led standardised methodology for calculating initial margin requirements for non-centrally cleared OTC derivatives.

Box 1: Further work by BCBS, CPMI and IOSCO on margining practices

The BCBS, CPMI and IOSCO issued a report *Review of margining practices* for public consultation. Areas for further work proposed in the report include (see Table 1 in the executive summary):

- Noting that data and regulatory requirements in the non-bank sector are more heterogeneous than in the banking sector, one area of consultation relates to international work to identify gaps in data available to regulators. This work could help provide a more fulsome picture of the preparedness of market participants, particularly non-banks, for liquidity demands, including margin requirements.

- Additional international work could also identify ways market participants can further enhance their preparedness for liquidity demands, including margin requirements. This work could include a review of different liquidity measures and the types and usefulness of information and other analytical tools made available to market participants to measure potential margin increases and plan for those liquidity demands. To complement this, the committees also are consulting on proposals for work regarding clear, transparent, and more standardised disclosures in cleared markets which could increase the predictability of margin increases, allowing for better participant preparedness and enhanced understanding of, and comparisons among, CCP model behaviour.

- Regarding non-bank liquidity arrangements and intermediaries' provision of liquidity to clients, the committees could explore the effectiveness of those arrangements during periods of extreme stress and/or volatility and how additional disclosures or data could be useful to relevant stakeholders, to form a fuller picture of non-bank preparedness and intermediaries' provision of liquidity to clients. This can allow for comparability, data quality checks, and usable reporting data from both banks and NBFIs.

- In addition, CPMI, IOSCO and BCBS are consulting on areas related to margining practices in centrally cleared and non-centrally cleared markets. Some potential areas are reviewing good practices, current disclosures and gaps regarding margin requirements, CCP IM model transparency, and effectiveness of anti-procyclicality tools. This could include further work on the degree and nature of CCP margin models' responsiveness to volatility and other market stresses, including impact, costs and benefits of this responsiveness for CCP resources and the wider financial system. In addition, the review could include work to understand and potentially measure the degree of responsiveness of non-centrally cleared margin models to market stresses.

3.4. Liquidity, structure and resilience of core bond markets

The orderly functioning in normal and stress times of core bond markets is crucial for the proper functioning of the financial sector and the real economy. Primary markets, where issuers place their bonds with institutional investors, are crucial to provide funding to corporates to finance their commercial activities as well as to governments to meet their spending needs. Secondary markets allow different types of investors to gain exposure to these asset classes, optimise the compositions of their portfolios and divest their money if they so wish. The availability of bonds in different currencies also allows investors to hedge risks associated with currency fluctuations and borrowers to finance their activities in different jurisdictions. Government bond markets are also crucial for the transmission of monetary policy decisions and are used as a benchmark to price other financial instruments and bonds.

In many jurisdictions, the size of both corporate and government bond markets has considerably increased in recent years. Corporate bond markets have grown because of the reduced reliance on bank lending in many jurisdictions and the diminishing role of equity capital as a source of funding. A similar trend, which accelerated substantially as governments responded to the challenges posed by the COVID-19 pandemic, is present in government bond markets with public debt levels rising in many jurisdictions. Both trends were also facilitated by the low interest rate environment which makes debt financing particularly cheap.

New market participants such as principal trading firms (PTFs) and hedge funds have gained importance in some segments, especially government bonds. But secondary bond markets are still heavily reliant on bank dealer intermediation. While in some government bond markets (especially US Treasuries) the involvement of PTFs and hedge funds is now substantial, market participants usually interact through dealers in many other instances. These dealers are predominantly banks that use their network of contacts to intermediate flows and warehouse bonds on their balance sheets.

Many core bond markets experienced significant stress in March 2020, including markets that are usually very liquid. With very few exceptions such as Japan and China, a substantial increase in the cost of liquidity was visible in many corporate bond markets. Primary market issuance of corporate bonds was significantly curtailed during March and April 2020, with most markets closed in mid-March. Secondary markets for corporate bonds suffered material spread widening in March 2020 consistent with a “dash for cash”. Spreads widened significantly (on average 3 times pre-COVID levels), with investment grade bond spreads widening more than lower-rated bonds. Government bond markets were not immune, including the US Treasury market that is usually the most liquid market in the world, as they experienced very large price movements and a significant increase in the costs of transaction, with bid-ask spreads increasing by a factor of ten in some cases.

The FSB is carrying out work with IOSCO to analyse the structure and resilience of corporate and government bond markets across jurisdictions. The focus of this work is on the lessons from the March 2020 turmoil and on potential implications for future policy.

- IOSCO, working with the FSB, is analysing the microstructure of corporate bond markets as well as the resilience of liquidity provision in these markets. Having completed an initial review of the March 2020 episode, IOSCO is currently analysing the drivers of the behaviour of different market participants during that period.

- The FSB is examining the functioning and resilience of core government bond markets, including with respect to the role of dealers and non-bank leveraged investors. This work will involve taking stock of recent changes in the structure and liquidity of these markets and analysing government bond market liquidity (and related repo and futures markets) in March 2020. It will also include an assessment of the behaviour of market participants (particularly dealers), an examination of the drivers of behaviour, and the identification of factors that drive the resilience of government bond markets.

3.5. USD funding and external vulnerabilities in emerging market economies

The FSB is examining the external funding pressures faced by EMEs during the March 2020 market stress. During this period, severe strains in offshore dollar funding markets emerged, especially in EMEs, as non-US corporates were unable to roll over funding at a reasonable cost and sold their dollar-denominated assets. Against this background, work is examining USD funding pressures, domestic corporate bond sales, foreign exchange markets and capital outflows from EMEs, and the interaction between USD funding and vulnerabilities relating to EMEs' external finance.

An important element of that work is documenting changes in the supply of and demand for USD funding in emerging markets prior to and during the March 2020 market stress. This includes analysis of whether structural changes in the supply of finance to EMEs – including the growth of market-based finance in the decade prior to 2020 – may have magnified funding pressures. At the same time, demand for external funding increased during the market stress, as firms sought precautionary cash and to hedge their exposures to USD dollars. These effects may have been amplified by dislocations in the markets of some USD-denominated securities, including the US Treasuries market.

There are three components to the work:

- First, a stocktake of recent trends in the prevalence and structure of EMEs' external financing, focusing on the shift towards non-bank financing. This includes changes in the composition of domestic versus foreign currency-denominated financing and the motivation for such changes. It also covers the development of domestic currency bond markets and participation by foreign investors as well as the chains of transactions that facilitate the supply of USD funding to EMEs, including the key role of benchmark-driven investors in cross-border capital flows.

- Second, an examination of how these developments have contributed to the build-up of vulnerabilities in EMEs and to the stress during the turmoil. This includes analysis of the degree to which EMEs that were more reliant on external financing experienced greater increases in risk premia on their assets and liabilities. It also considers the degree to which this repricing may have been exacerbated by credit rating downgrades of EME sovereigns and other entities.

- Third, drawing policy implications about measures to enhance EME resilience in future stress. This includes examination of pre-existing policies to address EME vulnerabilities relating to foreign currency financing (e.g. limits on the mismatch between financial institutions' foreign-denominated assets and liabilities, foreign exchange (FX) risk management, and increases in foreign exchange reserves). It also covers the use and effectiveness of policy measures deployed in March that have not typically been used in previous EME crises (e.g. asset purchases by EME central banks, FX repo facilities).

4. Towards a systemic approach to NBFI

The March 2020 market turmoil has provided a real-world example of how vulnerabilities related to particular NBFI activities and entities can interact. An extremely high demand for liquidity during the 'dash for cash' resulted in the broad-based selling of financial assets and to sizeable redemptions from investment funds, margin calls resulting from increased volatility, and the unwinding of positions by some non-bank leveraged investors.[15]

Efforts to develop a systemic approach to NBFI can build on existing work. The work in specific areas under the NBFI work programme to date has helped to deepen the understanding of vulnerabilities related to particular activities and entities, including their implications for system-wide liquidity risk conditions. Many of these vulnerabilities had already been identified in previous work, and frameworks and tools have been developed by securities markets regulators, notably as a result of previous collaborative FSB-IOSCO work, to address them.[16] However, enhancing the understanding of systemic risk in NBFI and, where appropriate, developing policies to address such risk need to take explicit account of the lessons from the March 2020 turmoil, including a better understanding of the interactions of relevant vulnerabilities and the increased importance of assessing interconnectedness.

4.1. Enhancing understanding of systemic risk in NBFI

Understanding systemic risks in NBFI involves analysis of the interaction and propagation of risks from a system-wide perspective. Conceptually, considering the framework in section 2 and the initiatives carried out under the NBFI work programme, such a system-wide perspective would combine the following layers:

- An assessment of potential vulnerabilities and the resulting liquidity demands under stress across different non-bank financial institutions and markets. An important part of the assessment would concern the capacity of different liquidity providers in those markets to respond to the spike in demands, and the effectiveness of existing policy tools in preventing large scale liquidity imbalances from materialising.

- The identification and quantification, to the extent possible, of the main interconnections that could propagate market stress across the global financial system. Such interconnectedness maps would show the main financial interlinkages between ultimate savers and borrowers in the economy as well as market participants.[17] They would help illustrate how the actions by different actors to meet liquidity demands – such as using available liquidity buffers, pledging collateral for repo, redeeming fund investments,

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

16 See, for example, the FSB reports on *Assessment of shadow banking activities: risks and the adequacy of post-crisis policy tools to address financial stability concerns* (July 2017) and *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities* (January 2017); and the IOSCO *Recommendations for Liquidity Risk Management for Collective Investment Schemes* (February 2018).

17 These financial linkages include, for example, day-to-day cash flows as a result of certain economic activities (e.g. pension contributions, investment in funds) and contingent cash flows triggered from market developments (such as margin calls) or the performance of real-economy borrowers (such as credit downgrades or defaults).

engaging in asset sales, or tapping back-up lines of credit – might propagate across the financial system.

- An assessment of the potential interaction of vulnerabilities and interconnections, and their implications for the liquidity of core markets that underpin the functioning of the global financial system, including government bond, short-term funding and foreign exchange swap markets. Examples, based on work carried out to date, include analysing how margin calls may lead to redemption pressures in MMFs that contribute to stress in short-term funding markets; or how the reliance on US dollar debt issuance by non-US corporates, combined with currency mismatches and inadequate hedges, can lead to liquidity pressures by foreign investors in the US Treasuries market.

This work also involves exploring how a more effective use of existing data, and in some cases greater availability and better quality of data, could enhance the authorities' ability to monitor, assess and mitigate systemic risk. This could include:

- How expanded coverage and better quality of data on the activities and positions of market participants and on market functioning could help monitor trends and assess vulnerabilities in specific NBFI segments. A key finding of the NBFI work to date has been that more data may be needed in some cases. Examples include information on the preparedness of market participants for liquidity demands (e.g. to manage margin calls); on the MMF investor base (to assess behaviour and concentration of ownership); and on issuance and trading activities in short-term funding markets (to assess the ability of those markets to absorb sales, as well as to foster more competition among market participants and diversify the investor base).

- How effective use and greater sharing of information already collected can enhance monitoring of the build-up of risks. Available data (e.g. derivatives transactions in trade repositories) could be used more effectively to map interconnections and monitor non-bank financial institutions' use of leverage and concentration of exposures (e.g. across prime brokers), as well as to consider whether greater sharing of such data across authorities could help in this regard.

Further work on the analytical layers described above and effective use of existing and potentially new data could allow authorities to enhance tools to monitor systemic risk. Such tools could include:

- Refined indicators of vulnerabilities in individual sectors and associated with particular activities, including metrics for liquidity imbalances and leverage by non-bank investors.

- Augmented interconnectedness maps for different types of non-bank entities and at various levels of granularity, including for cross-border exposures.

- System-wide risk maps that combine metrics of vulnerabilities associated with particular entity types and activities with interconnections and the identification of potential amplification and feedback loops. Such risk maps could also be used as a basis for scenario analysis.

- Stress tests, where appropriate, to assess the ability of market participants to respond to a shock and analyse common vulnerabilities and major spillovers across markets. Reverse stress tests could also be considered to identify major tipping points, which can then be compared to scenarios or historical episodes.

The approach towards taking a system-wide perspective set out in this report provides the flexibility to analyse also new market developments and emerging risks. The structure of NBFI keeps evolving, not least due to technological innovation, which results in new forms of financial activity and new entities providing financial services. The analytical approach above, together with the framework in section 2, provide a basis for assessing the potential impact of new market developments on NBFI resilience. More broadly, the framework in this report can serve as the basis for assessing the impact of such changes on the financing of the real economy, thereby supporting considerations of both resilience and benefits.

4.2. Developing policies to enhance NBFI resilience

Policies to address systemic risk in NBFI will have to take into account the heterogeneity of the sector. The diversity of entities and activities in the NBFI sector is reflected in a great variety of business models, balance sheets and financial exposures that may give rise to vulnerabilities. Policy measures to strengthen the resilience of individual parts of the NBFI ecosystem are therefore a key part of addressing systemic risk in NBFI.

There is already a well-established and diverse set of policy tools for NBFI. The FSB, working with SSBs, developed a framework and policy toolkit for strengthening the oversight and regulation of non-bank entities.[18] The toolkit is designed to look at the underlying economic function rather than specific legal form and structure, and offers a range of options to address different risk types that may be present across entities and activities in the NBFI sector. Many of these tools have been developed to serve other purposes (e.g. investor protection), but they can also be useful to address systemic risk. An important consideration in this context is that several of these tools are in the hands of market participants, rather than authorities. Given the linkages between banks and NBFI, prudential regulations governing the exposure of banks to that sector are also relevant for enhancing NBFI resilience.[19]

Drawing on the above framework and findings from work to date (particularly on MMFs), the types of policies that could be considered to enhance NBFI resilience include:

- policies to mitigate unexpected and significant shifts in liquidity demand (e.g. reduce or better manage liquidity mismatch and leverage of investors, internalise liquidity costs for redeeming investors to minimise first mover advantage, or address regulatory and market practices that create cliff effects and give rise to market dislocations).

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[18] See the FSB Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities (August 2013) and the Thematic Review on the Implementation of the FSB Policy Framework for Shadow Banking Entities (May 2016).

[19] One of the areas in which policies were adopted to mitigate the potential systemic risks associated with NBFI was on the spillovers between the regular banking system and the NBFI sector. This included enhancements to consolidation rules for off-balance sheet entities; stronger capital rules for banks' exposures to non-banks (higher risk-weights for exposures to unregulated financial entities, risk-sensitive capital requirements for banks' investments in the equity of funds, and a standard for measuring and controlling large exposures); and guidance on the identification and management of step-in-risk.

- policies to enhance the resilience of liquidity supply in stress (e.g. improve market structure and functioning by reviewing the drivers of dealer behaviour in stress, as well as the effectiveness of trading and clearing platforms).

- measures to enhance risk monitoring and the preparedness of authorities and market participants (e.g. additional reporting and disclosure requirements, stress testing).

The focus of NBFI policy work is to ensure that the toolkit is adequate and effective from a system-wide perspective, drawing on the lessons from the March 2020 market turmoil. This involves examining sources of liquidity imbalances that are not covered by existing frameworks (gaps); assessing the interaction/consistency and compatibility of tools in different parts of NBFI, given the linkages within the sector and with banks; and considering policy measures to address the build-up of risks over time due to conjunctural factors. While the ultimate goal of system-wide resilience is similar to that of macroprudential policies for banks, the policy tools needed to ensure this resilience for nonbanks are likely to differ from those for banks, given the nature and diverse set of entities and activities in the NBFI sector. The toolkit also needs to be flexible to ensure that financial stability risks from new financial activities and entities (e.g. those associated with firms outside the regulatory perimeter) are addressed.

Policies to address systemic risk associated with NBFI need to consider the impact on financial system resilience as a whole. Measures to enhance resilience of individual segments may not effectively address systemic risks if they result in the transfer of risk to other sectors, including to entities or activities currently outside of the regulatory perimeter. Efforts to strengthen NBFI resilience should not therefore compromise the resilience in other parts of the financial system such as the banking sector or financial market infrastructures.

Complementary to these policies is work on operational considerations for effective official sector interventions to address market dysfunction. The objective of this work is not to promote interventions as a policy tool to enhance NBFI resilience, which would be inconsistent with the objective of the work programme, but to help ensure official sector liquidity provision in events that threaten systemic stability without exacerbating moral hazard.

A key overarching principle for public interventions is that they should act as backstops and should not substitute for the primary obligation of market participants to manage their own risks. Acting as a backstop implies that the central bank should not be involved in the regular operation of private markets and should not interfere with normal price discovery or market determination of the allocation of resources. An overreliance on central bank facilities risks distorting intermediation of the financial system, market mechanisms and incentives. It also poses financial risks to central banks and public authorities more generally. Public support to restore market functioning should therefore only be utilised in tail events. While NBFI reforms may not have prevented the dash for cash or the need for official sector support in March 2020, they can help mitigate the magnitude and scale of future interventions.

International cooperation and coordination is necessary given the cross-border nature of NBFI. The March 2020 experience indicates that cross-border NBFI activity can lead to spillovers, contagion and exacerbate procyclicality. For example, the stress experienced by some MMFs in March 2020 had a cross-border dimension, in part because of the reliance of foreign banks on short-term USD funding, and in part because of differential effects of policy measures to support USD markets on funds domiciled in the US and abroad. A less resilient NBFI sector in one

jurisdiction could impact access to financing or market conditions in another jurisdiction directly or through firms' activity in key markets. Moreover, firms could move activities to where there is the least regulatory constraint, undermining actions to enhance resilience. The objective of international cooperation is therefore to mitigate potential spill-overs from cross-border linkages; help ensure a level playing field across firms and jurisdictions; and reduce the risk of harmful market fragmentation.

5. Way forward

The focus of the NBFI work programme in 2022 is to use the insights from analysis in particular areas to develop a systemic approach to NBFI. 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 2022 with the main findings across different areas and policy proposals to address systemic risk in NBFI. Table 1 in the Executive Summary provides an overview of the work programme on NBFI for 2022 and beyond.