FSB FINANCIAL STABILITY BOARD

Leverage in Nonbank Financial Intermediation

Final report

9 July 2025

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Table of Contents

Executive summary

This report presents the Financial Stability Board's (FSB) policy recommendations to address financial stability risks created by leverage in nonbank financial intermediation (NBFI). This work is part of the broader FSB work programme on enhancing the resilience of NBFI, which is intended to ensure a more stable provision of financing to the economy and reduce the need for extraordinary central bank interventions.

In 2023, the FSB published a report on the financial stability implications of leverage in NBFI ('NBFI leverage report'). The NBFI leverage report found that NBFI leverage played a significant role in stress episodes, such as the March 2020 market turmoil, the default of Archegos in March 2021, the commodities market turmoil in 2022, and the Liability-Driven Investment (LDI) crisis that amplified stress in the UK Gilt market in September 2022. Following these episodes, authorities have taken important policy steps to address some of the vulnerabilities that came to the fore, while substantive policy work has also been completed by the standard-setting bodies (SSBs) and the FSB, such as the Basel Committee on Banking Supervision (BCBS) work on counterparty credit risk management, the joint work by the BCBS, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) on margining practices, and the FSB report on the liquidity preparedness of nonbank market participants for margin and collateral calls. These policy developments are expected to contribute towards addressing financial stability risks created by NBFI leverage.

This report aims to address financial stability risks created by NBFI leverage that may remain or may arise in the future. It focuses on those risks that may arise in financial markets that are at the core of the financial system and whose functioning is essential for the real economy ('core financial markets'), and risks that may arise through interlinkages between leveraged nonbanks and systemically important financial institutions in their role as leverage providers.

The recommendations of this report are intended to draw and build on the policy steps already taken by authorities and the work done by the SSBs. The recommendations do so by setting out an integrated approach, according to which authorities should (i) have a domestic framework in place to identify and monitor financial stability risks created by NBFI leverage in an effective, frequent, timely and proportionate manner and (ii) take steps to select, design and calibrate policy measures, or combinations of measures, that address in a flexible, targeted and proportionate way the financial stability risks that they identify.

The recommendations are addressed to FSB member authorities and focus on markets, entities, and activities where NBFI leverage can create financial stability risks. Such risks can vary across jurisdictions. Entities in scope are nonbanks that use either financial or synthetic leverage, including hedge funds, other leveraged investment funds, pension funds, and insurance companies. Where relevant, banks and broker-dealers are also in scope in their role as leverage providers.

The recommendations reflect public feedback received on a consultative version of the report, which the FSB published in December 2024. In particular, the FSB acknowledges (i) the high degree of heterogeneity of nonbanks, (ii) that leverage in some NBFI segments is relatively limited and is not likely to pose financial stability risks, (iii) the differences between banks and various types of nonbanks, which have motivated different regulatory approaches, as well as (iv)

the complex and varying nature of NBFI leverage in different jurisdictions. The FSB also recognises that certain leveraged activities by nonbanks can facilitate hedging, enhance efficiency and support liquidity in financial markets. For these reasons, the recommendations provide authorities with flexibility to tailor their policy response to their jurisdictional circumstances by selecting, designing and calibrating policy measures, or combinations of measures, that are most appropriate to the financial stability risks from NBFI leverage that they identify, while considering any adverse effects. In this context, authorities will share their policy responses in light of the financial stability risks they have identified, e.g. through FSB supervisory discussions.

The first three recommendations relate to risk identification and monitoring. Recommendation 1 emphasises that authorities should have a domestic framework to identify and monitor in an effective, frequent, timely, and proportionate manner, the financial stability risks created by NBFI leverage. Recommendation 2 sets out the need for authorities to assess and seek to address data challenges in their domestic risk identification and monitoring framework. Authorities should collaborate, where appropriate, to reduce those challenges that may hinder effective cross-border risk identification and monitoring, including by promoting better data and information sharing. Recommendation 3 recommends that authorities review the granularity, frequency, and timeliness of existing public disclosures and determine the degree to which additional or enhanced disclosures should be provided to the public to help identify or mitigate financial stability risks created by NBFI leverage, balancing the costs and benefits of doing so.

Recommendations 4 and 5 relate to NBFI leverage in core financial markets. They state that authorities should take steps to address the financial stability risks created by NBFI leverage that they identify in their core financial markets. When selecting policy measures to address identified risks, authorities should consider those that are most appropriate to the risks they identify, including activity- and entity-based measures, as well as concentration-related measures. In doing so, authorities should also consider any adverse effects of specific measures and, where these are identified, calibrate policy measures with the aim of minimising any unintended consequences.

Recommendations 6 and 7 relate to counterparty credit risk management. They recommend that authorities ensure the timely and thorough implementation of the BCBS's guidelines on counterparty credit risk for bank leverage providers, which represent an important element of a comprehensive policy response to financial stability risks created by NBFI leverage. They also ask that authorities review the adequacy of existing counterparty disclosure practices made privately between leveraged nonbanks and leverage providers and, where appropriate, consider developing, in partnership with industry, mechanisms, standards and/or guidelines to enhance the effectiveness of these disclosure practices.

Recommendation 8 emphasises that authorities should identify instances where various forms of NBFI leverage provision are subject to incongruent regulatory treatments which may result in regulatory arbitrage that can increase financial stability risks. Authorities should determine whether and how to address the identified incongruences, having regard to the treatment of similar situations in other jurisdictions.

Recommendation 9 emphasises the importance of cross-border cooperation and calls for authorities to engage proactively with their peers to facilitate coordinated crisis and/or policy responses to financial stability risks created by NBFI leverage, to the extent legally and

operationally feasible. The report concludes with a set of general principles to help guide authorities in the selection, design, and calibration of policy measures.

The FSB and SSBs will undertake further work to support and assist authorities in applying the recommendations. This work will begin with supervisory discussions among authorities and, later this year, members will consider whether to initiate follow-up work on recommendations 4, 5 and 7, including how such potential work could be scoped. International cooperation on the implementation of policy measures is critical to mitigate cross-border spillovers and avoid regulatory arbitrage.

1. Introduction

Over the past decade, the importance of nonbank financial intermediation (NBFI) for the financing of the real economy has increased. During this period, the NBFI sector has grown to almost half of global financial assets and become both more diverse and increasingly complex, with business models and strategies continuously evolving and often using leverage.[1]

However, leverage in NBFI can be an important amplifier of stress: if not properly managed, it creates a vulnerability that, when subject to a shock, can propagate strains through the financial system and create risks to financial stability. For the sake of conciseness, this report will henceforth refer to these concepts as "financial stability risks created by NBFI leverage" (or similar expressions, see Section 2).

In 2023, the FSB published a report on the financial stability implications of leverage in NBFI ('NBFI leverage report').[2] The NBFI leverage report found that NBFI leverage played a significant role in stress episodes, such as the March 2020 market turmoil, the default of Archegos in March 2021, the commodities market turmoil in 2022, and the Liability-Driven Investment (LDI) crisis that amplified stress in the UK Gilt market in September 2022. In the aftermath of those stress episodes, certain authorities have taken steps to address the risks they identified.

These episodes show that NBFI leverage can create financial stability risks particularly when it arises in financial markets that are at the core of the financial system and whose functioning is essential for the real economy ('core financial markets', see section 4.2), or through the interlinkages between leveraged nonbanks and systemically important financial institutions, in their role as leverage providers.

Building on the findings of the NBFI leverage report, this report issues policy recommendations to address financial stability risks from NBFI leverage. The recommendations set out an integrated approach, according to which authorities should identify financial stability risks created by NBFI leverage and implement appropriate policy measures to address the risks that they identify.

The work on NBFI leverage is part of a broader FSB work programme on enhancing the resilience of NBFI, which is intended to ensure a more stable provision of financing to the

1 FSB (2024), *Global Monitoring Report on Non-bank Financial Intermediation 2024*, December

2 FSB (2023), *The Financial Stability Implications of Leverage in Non-Bank Financial Intermediation*.

economy and reduce the need for extraordinary central bank interventions.[3] The intent is to achieve this through reducing excessive spikes in the demand for liquidity, strengthening the resilience of liquidity supply in stress, as well as enhancing risk monitoring and the preparedness of authorities and market participants. Within this work programme, the FSB recently finalised recommendations to enhance the liquidity preparedness of nonbanks for margin and collateral calls during times of market-wide stress.[4] In addition, the Basel Committee on Banking Supervision (BCBS) issued guidelines for counterparty credit risk management ('2024 BCBS Guidelines'), which include key practices for banks that have high-risk counterparty exposures, including with nonbanks.[5] The BCBS, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) also completed a review on margining practices in 2022, and have undertaken work to address findings in that review, publishing three reports in 2025.[6] The recommendations in this report set out an integrated approach for addressing the financial stability risks created by NBFI leverage, including by drawing and building on these initiatives.

2. NBFI leverage and financial stability risks

2.1. Leverage in the financial system

Leverage is a characteristic feature of modern economies and financial markets. As households and companies borrow to purchase homes, stabilise consumption over time, invest in projects, or manage cash flows, banks and nonbanks finance these activities, supported by their own use of leverage to increase exposures, boost returns or offset potential losses from those financing activities (hedging). Some financial firms also use leverage to invest in certain trading strategies that take advantage of price discrepancies, especially in highly liquid markets, such as those for government bonds.

Leverage can be either financial (through borrowing via loans, bonds, repurchase agreements (repo) and other securities financing transactions (SFTs) or synthetic (using derivatives that create exposures whose value depends on the value of an underlying asset). Leverage can either be on-balance sheet (e.g. loans or bonds) or off-balance sheet (e.g. holding shares in leveraged investment vehicles or special-purpose vehicles created to finance risky assets).

Certain leveraged activities can enhance efficiency and support liquidity in financial markets. For example, the use of leverage can allow entities to reduce risk by hedging or meet short-term cash needs without resorting to asset sales. In some cases, it can enable entities to act countercyclically and enhance market efficiency, playing a positive role in market stabilisation and supporting recovery during periods of stress. This is only feasible when leveraged entities maintain sufficient headroom to increase risk and leverage, including having sufficient liquidity

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3 FSB (2024), *Enhancing the Resilience of Non-Bank Financial intermediation*: *Progress Report*, July.

4 FSB (2024), *Liquidity Preparedness for Margin and Collateral Calls: Final report*, December]

5 BCBS (2024), *Final guidelines for counterparty credit risk management*, December

6 BCBS, CPMI, IOSCO (2022), *Review of margining practices* , September; BCBS, CPMI, IOSCO (2025), *Transparency and responsiveness of initial margin in centrally cleared markets – review and policy proposals*, January; BCBS, IOSCO (2025), Streamlining VM processes and IM responsiveness of margin models in non-centrally cleared markets January; CPMI, IOSCO (2025), *Streamlining variation margin in centrally cleared markets – examples of effective practices*, January;

resilience and uninterrupted access to funding from their counterparties. Banks and broker-dealers play a critical role in providing funding to leveraged nonbanks through loans, securities lending, repo financing and derivatives.

On the other hand, if not properly managed, the build-up of leverage creates a vulnerability that, when subject to a shock, can propagate strains through the financial system, amplify stress, and lead to systemic disruption through two main channels:

- The position liquidation channel involves deleveraging through position unwind and asset sales. This occurs when an adverse shock leads to unexpected liquidity demands on leveraged positions from collateral or margin calls. Procyclical deleveraging can also happen when investors breach risk or stop loss limits or aim to maintain a target level of risk (e.g. the value-at-risk) in their portfolio. Such asset sales and position unwinding, especially under stressed market conditions, can depress asset prices further, causing a feedback loop of additional liquidity demands and risk reduction that impacts other market participants exposed to the same asset class.

- The counterparty channel involves the default or distress of leveraged entities, which can impose direct losses on their counterparties, leading to a cascade of financial stress resulting in forced liquidations. For instance, a leveraged entity would likely default if its available liquid resources were insufficient to meet its counterparties' collateral or margin calls, or if mark-to-market losses entirely eroded the leveraged entity's capital, propagating the initial shock to the defaulting entity's counterparties. If these counterparties are not sufficiently resilient to absorb the associated losses, they may experience financial distress, further amplifying the shock. Shocks might also propagate without a default of the leveraged entity, if, due to the shock, its counterparties decide to reprice or withdraw their financing, thereby creating funding stress for the leveraged entity.

2.2. NBFI leverage and recent episodes of stress

There is significant heterogeneity in the nature and scale of nonbanks' use of leverage across jurisdictions, markets and types of nonbanks. Overall, such use has become increasingly complex, with leveraged strategies employed by nonbanks evolving continuously.

Several factors can amplify financial stability risks created by NBFI leverage, including interconnectedness, concentration, crowdedness and liquidity imbalances. For example, nonbanks can be interconnected with each other and with banks through both direct and indirect exposures. Direct exposures correspond to the network of financial relationships. Indirect exposures arise when nonbanks that do not have a direct financial relationship have similar portfolios or investment strategies, exposing them to the impact of each other's asset sales and making them more likely to react in a correlated manner during stress. Indirect exposures are typically more difficult to identify and quantify. In addition, the use of leverage to accumulate large and concentrated risk exposures, held either by a single nonbank or collectively by a cohort of nonbanks with highly similar investment strategies that lead them to act uniformly (i.e. crowdedness), can amplify the impact of adverse market shocks and generate significant losses.

Liquidity imbalances can also amplify stress, for example, when liquidity providers are unable or unwilling to intermediate in markets during periods of stress, which can accelerate the propagation of shocks through the position liquidation channel. In addition, liquidity and maturity mismatches within leveraged nonbanks, e.g. when leveraged positions are financed with shorter-term sources such as short-term repo funding, can create liquidity imbalances in periods of stress if the funding cannot be rolled over at short notice. Another type of liquidity imbalance can arise from the use of derivatives that require daily mark-to-market margining. Significant adverse price movements can generate large and unexpected liquidity demands relative to nonbanks' holdings of liquid assets or their ability to raise liquidity through asset sales.

Financial stability risks can materialise if leveraged nonbanks are forced to deleverage in a market unable to absorb the unwinding of positions and asset sales in an orderly manner. In addition, disruption in that market may spill over to other markets (the position liquidation channel), including those in other jurisdictions. Financial stability risks may also materialise if the concentrated leveraged exposures are held by nonbanks that are large enough to threaten systemically important counterparties (the counterparty channel). Examples of these dynamics were evident during recent episodes of stress.[7]

March 2020, the 'dash for cash'. As Treasury market volatility rose, margins on US Treasury futures positions increased, as did borrowing rates in US Treasury repo markets. These rising costs motivated traders active in the US Treasury cash-futures basis to partially unwind their positions, adding to the significant volumes of sales from other market participants and potentially amplifying market instability. The lack of supervisory guidance on maximum leverage for investment funds (including hedge funds) in non-centrally cleared government bond repo markets (an example of a core financial market), allowed such funds to incur significant leverage by borrowing with near-zero haircuts. In addition, leverage providers may have lacked sufficient visibility into clients' overall positioning and strategies that relied on transacting in US Treasuries, hinting at possible gaps in leverage providers' credit risk management and counterparty disclosure requirements.

- Since this episode, several policy measures have been adopted to address such adverse market dynamics, such as mandatory central clearing for eligible secondary market transactions in US Treasuries and US Treasury repo, which will impose minimum margin requirements on clearing members, covering a large segment of the market. Requirements for central counterparties servicing the US Treasury market were also introduced, including on the separation of house and customer margin.[8]

March 2021, the default of Archegos (an unregistered family office). This stress event was characterised by significant leverage and mispriced counterparty credit risk via total return swaps (TRS).[9] Leverage providers, including those that are systemically important financial institutions,

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7 See the Appendix 1 for a summary table.

8 SEC (2023), *Standards for Covered Clearing Agencies for U.S. Treasury Securities and Application of the Broker-Dealer Customer Protection Rule With Respect to U.S. Treasury Securities*, December.

9 Counterparties varied in terms of the robustness of their risk management practices and the degree to which they proactively assessed Archegos's exposures. Speech by Michael Barr (2024), *Michael S Barr: The importance of counterparty credit risk management*, March; European Central Bank – Sound Practices in Counterparty Credit Risk Governance and Management (2023), *Sound practices in Counterparty Credit Risk governance and management*, June.

did not receive full information on Archegos' concentrated exposures.[10] This led to inadequate initial margin, including insufficient concentration add-ons and inadequate limits on aggregate leverage. Moreover, family offices like Archegos largely fall outside the regulatory perimeter and were therefore not subject to the relevant entity-level reporting requirements. In addition, activities used to acquire synthetic leverage were not subject to reporting requirements in several jurisdictions.[11]

- Following the default of Archegos, authorities across many jurisdictions have collaborated on a supervisory response to address weak risk management practices, including through developing international guidelines for counterparty credit risk management.[12] In addition, US authorities implemented supervisory guidance targeted at leverage providers.[13] The US also substantially completed the implementation of their security-based swap regime in October 2021.

2022, commodities market stress. This event was characterised by position liquidation in response to increasing margins and counterparty credit risk in commodities markets, as clearing members of CCPs faced rising default risk and, in some cases, actual default of clients.[14] Nonbanks involved included commodity producers, commodity investment funds, CCPs, brokers, and physical commodity trading firms. Inadequate disclosure, or lack of disclosure requirements, between counterparties and exemptions for physically settled OTC derivatives from bilateral margining requirements and certain transaction reporting requirements, were identified as key policy gaps. Trading venues in some jurisdictions also lacked transparency on OTC exposures, which inhibited their ability to identify and manage the risks of larger concentrated positions.

- Since then, the London Metal Exchange (LME) has imposed weekly reporting of OTC exposures on members and introduced daily price limits.

September 2022, LDI crisis. Leverage in GBP-denominated LDI strategies amplified stress in the UK Gilt market (an example of a core financial market), leading to position liquidation in response to margin stress, risk limit breaches and heightened risks for their counterparties. Amplification factors included concentration of LDI funds at the long-dated, inflation-linked part of the UK Gilt market and interconnectedness with bank counterparties and other markets. These dynamics jeopardised UK Gilt market functioning with knock-on impacts to the real economy. For example, UK mortgage lenders withdrew mortgage products due to challenges in pricing them. Ultimately, liquidity supply and UK Gilt market functioning were restored via time limited and targeted central bank interventions. Several policy gaps were identified: shortcomings in banks' and LDI managers' risk management and operational processes; insufficient margin and collateral requirements, including near-zero haircuts in bilateral UK Gilt

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10 Key principals from Archegos have been convicted of fraud and manipulation, including lying to their counterparties.

11 However, Archegos' counterparties were subject to reporting requirements in some jurisdictions such as the EU, the UK and Hong Kong. For further details see ESMA (2022*) Leverage and derivatives – the case of Archegos*, and Cheng et al. (2023), *Building an integrated surveillance framework for highly leveraged NBFIs – lessons from the HKMA*, BIS Papers n. 137.

12 See footnote 5.

13 See Board of Governors of the Federal Reserve System (2021), *SR 21-19: The Federal Reserve Reminds Firms of Safe and Sound Practices for Counterparty Credit Risk Management in Light of the Archegos Capital Management Default*, December.

14 See FSB (2023), *The financial stability aspects of commodity markets*, February.

repo; lack of transparency on concentrated positions in Gilt markets; and lack of appropriate concentration and wrong-way risk margin add-ons or entity-based constraints.

- Since then, authorities in Ireland and Luxembourg have developed and introduced a yield buffer requirement for GBP-denominated LDI funds domiciled in their jurisdictions, as enabled by EU law. Separately, UK authorities have pursued additional measures for UK-domiciled defined benefit pension schemes that invest in LDI funds.

2.3. Data challenges, regulatory incongruences and challenges in cross-border cooperation

2.3.1. Data challenges

There are significant gaps in availability of the data and metrics necessary for authorities to monitor NBFI leverage and related financial stability risks in an effective and timely manner. For example, while most jurisdictions have derivatives reporting requirements in place, reporting requirements for SFTs are less common. Other data challenges relate to data use, data quality, data access and data reporting. For example, entity-level regulatory reporting is often less frequent and detailed, and available to authorities with substantial time lags, compared to granular activity-level reporting (e.g. data collected by trade repositories (TRs) on SFTs or derivatives).

Similarly, for some types of nonbanks or exposures, entity-level reporting may not be sufficiently granular or detailed for authorities to identify leveraged concentrated exposures within their markets.

There are additional, specific data challenges relating to nonbanks undertaking cross-border activities, and to nonbanks that are not subject to entity-level regulatory reporting requirements because they remain outside the regulatory perimeter. in these cases, risk identification may be inhibited by data access restrictions that authorities face. Further, the lack of sufficiently consistent data and metrics for the reporting of leverage across jurisdictions hinders authorities' ability to comprehensively assess and monitor NBFI leverage and associated financial stability risks across jurisdictions or at the global level.

2.3.2. Incongruences in the regulatory treatment of NBFI leverage

Incongruences related to the regulatory treatment of various ways through which leverage is provided to nonbanks, including through the use of certain financial instruments or certain forms and structures of NBFI leverage provision, may result in regulatory arbitrage opportunities.[15] Where such opportunities arise, market participants may shift risk-taking to the more advantageous instrument or financing form or structure, which can lead to a concentrated build-up of NBFI leverage. For instance, TRS transactions may act as a substitute for the sourcing or provision of leverage via traditional (i.e. cash) SFTs but can result in a smaller balance sheet

[15] While regulatory treatment is very important, there may be other factors affecting market participants' preference for specific products, e.g. taxation.

impact for banks when hedged via an offsetting TRS, therefore attracting lower regulatory capital requirements.[16]

2.3.3. Challenges in cross-border cooperation

A significant amount of NBFI leverage is provided and taken on a cross-border basis. Effective international cooperation is important to support authorities' efforts to mitigate financial stability risks created by NBFI leverage. This could include more closely integrated cross-border risk monitoring and coordinated responses to stress, as well as international engagement when developing and operationalising policies to address NBFI leverage vulnerabilities that build up on a cross-border basis. A better use of the data already available to authorities combined with more efficient data sharing across jurisdictions would enable authorities to more precisely assess and respond to financial stability risks created by NBFI leverage that span multiple jurisdictions.

International cooperation may be limited by legal boundaries and may be subject to technical impediments, e.g. on cross-border data and information sharing, as well as difficulties inherent in harmonising policy responses across disparate regulatory frameworks. Many jurisdictions face stringent legal obligations, which require strict criteria to be met before confidential firm-specific regulatory data or information can be shared with authorities in other jurisdictions (and, in some cases, also with other domestic authorities). Bilateral or multilateral information sharing arrangements, such as through memoranda of understanding (MoUs), can facilitate data and information sharing in a timely manner, subject to the legal obligations of the parties and the requisite criteria for their use. In addition, even when MoUs allow for cross-border data or information sharing, technical impediments resulting from differing regulatory reporting standards or policy frameworks may hinder efficient or effective cooperation.

3. Policy measures: scope and terminology

There is a broad range of policy measures that can help to identify and address the financial stability risks that NBFI leverage can create. These can be categorised as follows: public and counterparty disclosure, activity-based and entity-based measures (including concentration-related measures), and supervisory guidance.

3.1. Disclosures

Disclosures do not directly limit NBFI leverage but can enhance transparency and improve market discipline by providing information that may help market participants to better monitor and respond to financial stability risks created by NBFI leverage. Disclosures complement other

[16] Specifically, a bank that matches long and short positions in the same underlying reference asset but across different counterparties can significantly save on regulatory capital compared to equivalent cash SFT exposures. This potentially preferential treatment of TRS transactions may have contributed to the significant increase in the usage of TRS by banks. Other possible incongruences may be related to margin treatment, which could affect nonbank behaviour, such as shifting leveraged activities between centrally cleared and non-centrally cleared markets, or between products with similar economic profiles. For example, GBP-denominated LDI funds invested primarily in bilateral non-centrally cleared UK Gilt repos rather than using centrally cleared interest rate swaps given the lower hedging costs and the much lower haircuts on bilateral UK Gilt repos, compared to the initial margin demanded by CCPs on centrally cleared swaps. This allowed LDI funds to increase leverage.

measures that restrict NBFI leverage and support the implementation of regulatory guidance on liquidity and counterparty credit risk management.

3.1.1. Public disclosure

Public disclosure refers to information that is shared with the public. Such information on NBFI leverage risks can be disseminated

- by authorities, e.g. aggregated data and information from regulatory reporting, market monitoring reports, financial stability reports and/or system-wide stress testing results;[17]
- by market infrastructures, e.g. Public Quantitative Disclosures by CCPs; or
- by leveraged nonbanks, e.g. annual investor reports.

Public disclosure can improve transparency about the (i) level and distribution of leverage, (ii) concentration of exposures, and (iii) general market trends and practices. For example, publicly disclosed aggregated or otherwise anonymised information on leverage, positions and market liquidity conditions can help market participants identify concentration of exposures and crowdedness. It can also improve the ability of market participants to estimate losses and liquidation costs under stressed conditions, adjust their own exposures and calibrate liquidity buffers to absorb shocks. Separately, disclosure by leveraged nonbanks can facilitate investor protection by providing investors with information that may help them assess potential risks associated with the use of leverage.

3.1.2. Counterparty disclosure

Counterparty disclosure refers to the information that is privately shared by leveraged nonbanks with their leverage providers to support the leverage providers' management of counterparty credit risk. Insights on the scope and scale of their nonbank clients' use of leverage can help leverage providers (particularly prime brokers) to estimate clients' potential future losses in stress, as well as anticipate the time and cost it would take to liquidate clients' portfolios if they were to default on their obligations. Leverage providers can then adjust their risk tolerance and calibrate margin requirements, haircuts and risk limits accordingly. This can lead leverage providers to reduce exposures towards certain nonbank clients, such as those with concentrated positions that are spread across multiple counterparties. This could also support more efficient pricing of the funding they provide, potentially leading to a reduction of NBFI leverage, particularly where concentration and crowdedness are more pronounced.

There is a potential tension between nonbanks' need for confidentiality and leverage providers' need to manage counterparty risk. This might be mitigated through the use of risk disclosure, such as the scale of largest, anonymised, positions or entity-level stress testing results, rather than detailed position-level disclosure. This could support leverage providers' ability to effectively

[17] In the US, the Office of Financial Research publish a Hedge Fund Monitor that aggregates data across public and private sources and presents these data in a publicly accessible tool.

manage counterparty risk, while minimising the risk of disclosing nonbanks' confidential information.

3.2. Activity-based measures

Activity-based measures are primarily designed to mitigate counterparty credit risk. They may also indirectly contribute to restricting the amount of leverage used by firms engaged in certain leveraged investment and trading strategies, by increasing its cost, in a way that is proportionate to their riskiness. Activity-based measures can be implemented via market-wide margin or haircut requirements and central clearing requirements, or via the application of rules that require regulated dealer banks to impose such requirements on their counterparties. Notwithstanding possible thresholds or exemptions, activity-based measures would apply to a wide range of nonbank entity types, including those that lie outside of the regulatory perimeter.

Examples of existing activity-based measures adopted through international standards include margin and central clearing requirements introduced in the aftermath of the GFC, such as (i) minimum margin requirements for non-centrally cleared derivatives, (ii) central clearing requirements for certain derivatives, and (iii) minimum haircuts for non-centrally cleared SFTs in which the financing is provided to nonbanks against collateral other than government securities.[18]

Margin requirements for centrally and non-centrally cleared markets may also include requirements for margin concentration add-ons on top of standard initial margin requirements. CCP requirements depend on the size of an entity's exposure relative to its overall portfolio, to market liquidity, and to other clearing members' positions enabling CCPs to directly constrain concentrated positions.

Recent stress events suggest that there may be pockets in non-centrally cleared markets where, under normal market conditions, haircuts or initial margins remain very low, leading to under-pricing of risks. For example, there may be gaps in existing requirements, such as a lack of initial margin requirements or minimum haircuts for SFTs backed by government securities or exemptions from margin requirements on non-centrally cleared derivatives for certain products or entities. While initial margins applied to nonbanks are typically calibrated to include the effects of wrong way risk, correlation and concentration, such calibration may not adequately capture tail risks arising from system-wide stress events.

Effective design and calibration (see Section 4.6) is important to limit any adverse effects of activity-based measures on market liquidity or on the cost of hedging, particularly when these measures are applied universally across market participants. Margin requirements may also exacerbate liquidity imbalances by increasing liquidity demands during a period of stress when liquidity is scarce (procyclicality). Netting and cross-product margining arrangements may reduce these adverse effects but could also dilute the effectiveness of some of the measures in constraining leverage. Effective design and calibration (see Section 4.6) is therefore also

[18] BCBS-IOSCO (2020), *Margin requirements for non-centrally cleared derivatives*, April; and BCBS (2021), *CRE56 - Minimum haircut floors for securities financing transactions*, July. FSB (2010) *Recommendations on implementing OTC Derivatives Market Reforms.*

important to account for the possibility of correlation breakdowns and to capture concentration and illiquidity risk.

3.3. Entity-based measures

Entity-based measures, such as leverage or concentration limits, are designed to restrict the amount of financial and synthetic leverage a nonbank can take.[19] Entity-based constraints could be used to limit leverage across all of an entity's activities or to limit aggregate leverage of cohorts of entities with similar types of strategies or products. Such measures can be effective in preventing the build-up of NBFI leverage that creates financial stability risks, thereby reducing the likelihood and magnitude of procyclical deleveraging. Depending on the risk profile of the entity and the objectives of the measure, leverage constraints can be direct or indirect, as well as be risk-based or non-risk-based.

Examples of measures that are already in place include direct structural limits for real estate funds in Germany, France, Ireland, Italy, and Singapore. Such measures impose an upper limit to the ratio between total debt and total assets of the fund and were implemented to protect retail investors or the property market from the effects of procyclical deleveraging. Direct entity-level constraints on financial leverage have also been applied in Japan to all investment trusts, public or private; in India to alternative investment funds;[20] and in the US to certain investment funds. Indirect constraints on leverage include measures such as the yield buffer requirements for GBP-denominated LDI funds, which were introduced in Ireland and Luxembourg and calibrated to ensure that LDI funds remain resilient to an extreme but plausible scenario.[21] Other indirect measures, implemented to protect investors, include Value-at-Risk (VaR) constraints on UCITS funds in the EU and the UK.

Entity-level leverage measures are often applied to nonbanks that pursue a specific strategy as their predominant activity. Entity-level leverage measures are less common for entities with multiple, complex strategies, such as hedge funds and other leveraged funds. There are challenges to calibrating entity-level limits for nonbanks that could potentially re-allocate leverage across activities with different risk profiles.

There may also be challenges related to the implementation of entity-based measures. Implementation typically occurs via legal frameworks that define and regulate the types of entities in scope; therefore, entities that are outside the regulatory perimeter would not be in scope of such measures. When relevant regulated entities are located in non-domestic jurisdictions, cross border cooperation or reciprocity may be required to implement entity-based measures that adequately address the targeted risk.

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19 In the context of fund management, entity-based measures are expected to apply to funds, types of funds, or cohorts of funds, rather than to fund managers.

20 In India, lending to alternative investment funds (AIFs) is not explicitly restricted by the Reserve Bank, and investments by banks in certain categories of AIFs is permitted to a limited extent. The capital market regulator permits borrowing by AIFs only to meet temporary funding requirements with limits on the amount and the number of times they can borrow.

21 A yield buffer requirement refers to an expectation that funds need to maintain sufficient liquid asset buffers to be able to withstand a certain basis point increase in yields. Given the duration of a fund's portfolio (i.e. its interest rate sensitivity), the yield buffer puts a limit on the maximum leverage a fund can take to maintain a positive NAV following a specified interest rate shock. LDI strategies incur leverage through both repo and derivatives, so a risk-based measure is more appropriate to ensure they maintain liquidity resilience and solvency in stress, compared to a measure that restricts balance sheet borrowing only. Such limits were introduced in Ireland and Luxembourg in November 2022.

Calibration of entity-based measures also needs to balance risk mitigation with the beneficial aspects of NBFI leverage. For example, measures may inadvertently restrict *bona fide* hedging activities, which can be difficult to define and identify. Entity-based measures could also generate potential adverse effects on liquidity in markets where the (nonbank) entities are significant liquidity providers.

3.4. Supervisory guidance

Supervisory guidance sets out authorities' expectations that firms follow practices which enhance their resilience and risk management, and which may contribute to limiting the amount of leverage they provide or incur when pursuing specific risk-taking activities and to better managing the impacts of deleveraging.

The implementation of guidance is achieved through supervisory processes. Guidance is faster to implement and update than regulation, and therefore it can be used to respond more dynamically to changes in the market environment or where other routes are not possible. However, because guidance is rooted in existing regulation, it cannot introduce new policy measures; rather, it can clarify the application of existing measures, including by adjusting expectations within the existing regulatory remit. Depending upon existing regulatory frameworks, guidance can be directed to both regulated nonbanks using leverage and to the providers of leverage.

Some jurisdictions have issued supervisory guidance for nonbank sectors related to their use of leverage that aims to enhance the measurement and management of liquidity risk associated with margin calls on leveraged positions or strategies.[22] Supervisory guidance applied to leverage providers aims to enhance counterparty credit risk management standards, by informing banks' margining practices and their risk appetite towards leveraged entities or crowded and concentrated positions.[23] Guidance may also be issued in response to a specific market event or stress, targeted to address identified deficiencies in risk management practices.[24]

4. FSB recommendations

The FSB recommendations aim to address financial stability risks created by NBFI leverage. Following recent episodes of stress, authorities have taken important policy steps to address some of the vulnerabilities that came to the fore, while substantive policy work has also been completed by the SSBs and the FSB, such as the BCBS work on counterparty credit risk management, the joint work by the BCBS, CPMI and IOSCO on margining practices, and the

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22 Examples include the Guidance on Effective Liquidity Risk Management for Investment Funds in Canada and the Supervisory Statement on Liquidity risk management for insurers in the UK. For Canada, see CSA (2020), *Guidance on Effective Liquidity Risk Management for Investment Funds*, September. For the UK, see Bank of England (2019), *Liquidity risk management for insurers*, September.

23 For example, the 2024 BCBS Guidelines set out expectations around governance, metrics, aggregation of exposures, concentrations, stress testing, wrong-way risk, counterparty limits, margin practices, and collateral management practices.

24 For example, following the default of Archegos, several authorities published risk management guidance for prime brokers, which reinforced supervisory expectations on client onboarding, ongoing monitoring of client relationships and the importance of client disclosure regarding concentration, liquidity and leverage profiles.

FSB report on the liquidity preparedness of nonbank market participants for margin and collateral calls.

These policy developments and recommendations are expected to contribute towards addressing financial stability risks created by NBFI leverage. The recommendations in this report aim to address financial stability risks created by NBFI leverage that may remain or may arise in the future. They focus on those risks that may arise in financial markets that are at the core of the financial system and whose functioning is essential for the real economy, or risks that may arise through interlinkages between leveraged nonbanks and systemically important financial institutions in their role as leverage providers.

The recommendations are intended to draw and build on the policy steps already taken by authorities and the work done by the SSBs. The recommendations do so by setting out an integrated approach, according to which:

- Authorities should have a domestic framework in place to identify and monitor financial stability risks created by NBFI leverage in an effective, frequent, timely and proportionate manner. Authorities should consider incorporating a system-wide perspective in this domestic framework that appropriately captures (i) financial stability risks created by NBFI leverage that can be amplified by interconnectedness, concentration, crowdedness, and liquidity imbalances, as well as (ii) instances of regulatory arbitrage in how leverage is provided to nonbanks.[25] To enhance cross-border risk monitoring, authorities should proactively engage with their foreign counterparts.

- Authorities should take steps to select, design and calibrate policy measures, or combinations of measures, that address in a flexible, targeted and proportionate way the financial stability risks created by NBFI leverage that they identify. Authorities should do so in a manner that gives them confidence that the financial stability risks created by NBFI leverage in their jurisdiction have been sufficiently addressed. Insights from the domestic risk identification and monitoring framework should be used, as appropriate, to help select, design and calibrate policy measures which are effective and proportionate to the identified financial stability risks.

The recommendations are addressed to FSB member authorities and focus on markets, entities, and activities where NBFI leverage can create financial stability risks. Such risks can vary across jurisdictions. Entities in scope are nonbanks that use either financial or synthetic leverage, including hedge funds, other leveraged investment funds, pension funds, and insurance companies. Where relevant, banks and broker-dealers are also in scope in their role as leverage providers.

The FSB acknowledges the high degree of heterogeneity of nonbanks, the differences between banks and various types of nonbanks, as well as the complex and varying nature of NBFI leverage in different jurisdictions. The FSB also recognises that certain leveraged activities by nonbanks can facilitate hedging, enhance efficiency and support liquidity in financial markets. For these reasons, the recommendations provide authorities with flexibility to tailor their policy response to

[25] In some cases, incorporating a system-wide perspective may require cross-authority collaboration within a jurisdiction.

their jurisdictional circumstances by selecting, designing and calibrating policy measures, or combinations of measures, that are most appropriate to the financial stability risks from NBFI leverage that they identify, while considering any adverse effects.

The FSB and SSBs will undertake further work to support and assist authorities in applying the recommendations. This work will begin with supervisory discussions among authorities and, later this year, members will consider whether to initiate follow up work on recommendations 4, 5 and 7, including how such potential work could be scoped. International cooperation on the implementation of policy measures is critical to mitigate cross-border spillovers and avoid regulatory arbitrage.

4.1. Risk identification and monitoring

Recommendation 1: Authorities should have a domestic framework in place to identify and monitor financial stability risks created by NBFI leverage in an effective, frequent, timely and proportionate manner. Authorities should consider incorporating a system-wide perspective into their domestic framework. Authorities should regularly review their domestic framework, including the risk metrics utilised, and enhance it as appropriate. They should also take steps to improve international consistency in the definition and calculation of those metrics.

Authorities should have a domestic framework in place to identify and monitor financial stability risks created by NBFI leverage in an effective, frequent, timely and proportionate manner. The domestic framework should be composed of tools and processes for regular monitoring and be proportionate to the financial stability risks created by NFBI leverage within the jurisdiction, as well as potential cross-border spillovers from and to other jurisdictions.

Where feasible, authorities should consider incorporating a system-wide perspective into their domestic risk identification and monitoring framework that appropriately captures financial stability risks created by NBFI leverage that can be amplified by interconnectedness, concentration, crowdedness, and liquidity imbalances, as well as instances of regulatory arbitrage in how leverage is provided to nonbanks (see Recommendation 8). When doing so, authorities should consider engagement with the industry, where appropriate. In some cases, incorporating a system-wide perspective may require cross-authority collaboration within a jurisdiction that includes supervisors of nonbanks, banks, broker-dealers and others. To facilitate risk identification and monitoring, the domestic framework should be supported by risk metrics (‘toolkit metrics’), such as those described below and detailed in Annex 2.

Authorities should review their domestic framework on a regular basis, and enhance it as appropriate, including to reflect changes in market structure, investor base, and behaviour of market participants. When reviewing their monitoring framework, authorities should take steps, where appropriate and feasible, to improve international consistency in the definition and calculation of the toolkit metrics, particularly those that best capture financial stability risks created by NBFI leverage in their jurisdiction, as well as risks that may spill over from and to other jurisdictions. Authorities should also consider experiences and good practices in other

jurisdictions, e.g. on the use of data and metrics, including considering IOSCO's Recommendations for a framework assessing leverage in investment funds.[26]

4.1.1. Toolkit metrics

Financial stability risks created by NBFI leverage are multifaceted and may differ across types of leveraged nonbank activities and entities. As a result, authorities should consider a suite of toolkit metrics. The appropriate degree of complexity, specificity and granularity of the toolkit metrics, as well as the frequency and timeliness of their calculation, depend on a range of factors. Such factors include the nature and scale of NBFI leverage and the complexity of the business models and investment strategies of leveraged nonbanks present in the domestic financial system. Authorities should particularly consider those metrics that best capture key dimensions of the financial stability risks created by NBFI leverage in their jurisdiction and of those that spill over from and to other jurisdictions. Such dimensions include:

- *Leverage*, including gross, net and adjusted measures of leverage, capturing both financial and synthetic leverage, and their evolution over time.
- *Collateralisation, margins and liquidity risks related to leverage*, capturing the scale and composition of margin and collateral posted by nonbanks, as well as risks related to liquidity demands stemming from the use of leverage.
- *Sensitivity to market risk*, including the impact of changes in underlying risk factors and standardised stress test results.
- *Concentration risk*, at both entity-level and market-level, and crowdedness.

Authorities should calculate toolkit metrics at entity-level, considering both synthetic and financial and both on- and off-balance sheet leverage. For example, to facilitate the assessment of financial stability risks from concentration and crowdedness, authorities should consider the combined positions of nonbanks that have similar business models or investment strategies.

4.1.2. Addressing data challenges

Recommendation 2: Authorities should assess data challenges within their domestic risk identification and monitoring framework and seek to address them. This includes data challenges in relation to (i) authorities' use of available data, (ii) the quality, frequency and timeliness of available data, (iii) authorities' access to relevant data, and (iv) potential data gaps within existing reporting requirements. Authorities should collaborate, where appropriate, to reduce those challenges that may hinder effective cross-border risk identification and monitoring, including by promoting better data and information sharing, as set out in Recommendation 9.

The identification and monitoring of risks in a proportionate and timely manner requires access to a wide range of data. When authorities review their domestic framework, they should consider the quality, frequency and timeliness of the data they use, as well as existing reporting

[26] IOSCO (2019), *Recommendations for a Framework Assessing Leverage in Investment Funds*, December.

requirements and their access to relevant data. Authorities should identify and address, in a proportionate manner, data challenges related to:

- *Data use*: relevant data is available to authorities, but it is not used, e.g. due to lack of human or technological resources to exploit the dataset.
- *Data quality*: relevant data is available to authorities, but it is not used due to insufficient data quality, including in relation to accuracy, completeness, frequency or timeliness.
- *Data access*: relevant data is not available to authorities, but it is reported and available to other (domestic or foreign) authorities.
- *Data reporting*: relevant data is not reported or otherwise available to any authority.

When addressing these challenges, authorities should consider both the costs and benefits of doing so. They should assess the effectiveness of current reporting regimes and minimise duplicative reporting, e.g. by promoting common approaches to data collection and data sharing among authorities, where feasible, with a view to improving the use of data already available to them for a more accurate assessment of financial stability risks. To facilitate effective monitoring across jurisdictions and minimise unnecessary reporting burdens for market participants, authorities should take steps to improve international consistency in definitions and methodologies for the calculation of toolkit metrics, as set out in Recommendations 1 and 9.

When reviewing their domestic framework, authorities should consider experiences in other jurisdictions, including on data reporting, data usage, and processes to improve the quality, frequency and timeliness of data. For instance, where entity-level information is reported with lags or insufficient granularity, authorities may consider combining it with other data sources. These could include transaction- or position-level data from TRs on derivatives and SFTs, or information collected from leverage providers or other (domestic or foreign) authorities. Authorities should also consider how improvements in the data they collect from market participants can help enhance data they disseminate to the public (see Recommendation 3).

Authorities should also take steps to remove obstacles to data sharing within their jurisdiction, where doing so would be consistent with their legal framework and subject to broader confidentiality requirements.

4.1.3. Public disclosure

Recommendation 3: Authorities should review the level of granularity, frequency, and timeliness of existing public disclosures and determine the degree to which additional or enhanced disclosures should be provided to the public to help identify or mitigate financial stability risks created by NBFI leverage, balancing the costs and benefits of doing so. Such disclosures include those by (i) authorities, including disclosure based on regulatory reporting data, (ii) the relevant financial market infrastructure providers or (iii) directly by financial entities. This includes dissemination by authorities of data and information on aggregate market positioning and transaction volumes based on existing regulatory reporting. Such additional or enhanced disclosures should be designed and calibrated to increase transparency, especially about concentration risk and crowdedness, with the aim to support market participants' ability to manage risks from NBFI leverage and estimate counterparty exposures and liquidation costs.

The effectiveness of public disclosures depends on the quality, timeliness and frequency of the information provided to market participants. Disclosures that are aggregated at a very high level or published with a substantial time lag or infrequently will be less effective for market participants' risk management. In contrast, more granular and timely disclosure, e.g. weekly publication of large positions broken down by participant type or transaction registration volumes at TRs, can be valuable to risk managers. At present, public disclosures on aggregate positioning are largely confined to commodity markets, while only very high-level aggregate data on transaction volumes is available from TRs.

Authorities may consider disclosing certain types of nonbank leverage-related information available to them based on existing reporting requirements. For example, periodic publication of aggregate data on the amount of, and trends in, leverage use across different types of nonbanks may help market participants to contextualise their own use or provision of leverage, and to identify the build-up of risks. Data and metrics on liquidity and aggregate positioning could also be disclosed for a wide range of markets, covering OTC and exchange-traded derivatives, SFTs and securities,[27] which could support monitoring of concentrations, crowdedness and less liquid conditions, also from a cross-border perspective. Authorities may also be able to combine and present aggregate data across different products to enable monitoring of trends in large, structural, and potentially crowded leveraged strategies that have been identified through their monitoring frameworks.

When considering enhanced public disclosure directly by financial entities, i.e. non-anonymous disclosure, the benefits of transparency for market discipline should be carefully balanced against possible unintended effects. In particular, disclosure of granular information, such as position-level information, could result in a reduction in participation and overall market liquidity due to the potential chilling effect on entities' activities. For example, entities might seek to operate below the disclosure threshold to avoid disclosing information.

Authorities should also consider the burden of additional reporting requirements on market participants and ensure that this remains proportionate, and that the granularity and timeliness of public disclosures, including of aggregate data, address any issues related to confidentiality and legal constraints.

4.2. NBFI leverage in core financial markets

NBFI leverage can be significant in markets that are at the core of the financial system and whose functioning is essential for the real economy ('core financial markets'). These core financial markets, which include government bond cash, repo, and derivatives markets, and real estate investment markets, play a fundamental role in supporting monetary policy implementation, financial intermediation, and risk management. Their resilience is critical for preserving financial stability, particularly during periods of stress. Such markets may differ

[27] For example, the Commitment of Traders (COT) reports provide transparency on exchange-traded commodity derivatives positions by highlighting the proportions of open interest held by the various categories of market participants and how this evolves over time. Some of these reports also include information on the concentration of open interest among the largest four and eight market participants. Other types of public disclosure relevant to understand leverage and liquidity conditions include the Public Quantitative Disclosures (PQDs) of CCPs as specified in the CPSS-IOSCO principles for financial market infrastructure, transaction volume data published by TRs and trade bodies (e.g. ISDA), and large position reporting in certain equity markets (e.g. the US, the EU, the UK, and Japan).

across jurisdictions, depending on each domestic financial system's architecture and institutional features. NBFI leverage can create or amplify dysfunction in these markets, when procyclical deleveraging during stress by leveraged nonbank entities, or a cohort of nonbank entities with similar or crowded strategies, leads to spillover effects and adverse feedback loops. These market disruptions can threaten financial stability and can have large adverse effects on the real economy.

The FSB acknowledges (i) the high degree of heterogeneity of nonbanks, (ii) that leverage in some NBFI segments is relatively limited and is not likely to pose financial stability risks, (iii) the differences between banks and various types of nonbanks, which have motivated different regulatory approaches, (iv) as well as the complex and varying nature of NBFI leverage in different jurisdictions. The FSB also recognises that certain leveraged activities by nonbanks can facilitate hedging, enhance efficiency and support liquidity in financial markets. For these reasons, the recommendations provide authorities with flexibility to tailor their policy response to their jurisdictional circumstances by selecting, designing and calibrating policy measures, or combinations of measures, that are most appropriate to the financial stability risks from NBFI leverage that they identify, while considering any adverse effects.

Recommendation 4: Authorities should take steps to address the financial stability risks created by NBFI leverage that they identify in their core financial markets. Where appropriate measures are not yet in place, activity-based and entity-based measures, as well as concentration-related measures, should be selected, designed and calibrated to be effective and proportionate to the identified financial stability risks. All measures should be reviewed periodically and enhanced, where appropriate, including to address risks from a system-wide perspective. Where existing legal and regulatory frameworks do not provide the necessary policy measures to address identified financial stability risks, authorities should consider adjusting or widening the scope of such frameworks, where appropriate.

Authorities should develop a comprehensive and coherent approach to address the financial stability risks that NBFI leverage can create in core financial markets in their jurisdiction. Where appropriate measures are not yet in place, policy measures should be selected as needed to best mitigate the specific financial stability risks that authorities identify (see Section 4.1 and Recommendation 5).

Activity-based measures can be used to target highly leveraged strategies employed by a range of nonbanks, including those that lie outside of the regulatory perimeter (see Sections 3.2 and 4.2.1). Entity-based measures can be used to directly constrain the amount of leverage, and thereby enhance the resilience of leveraged nonbanks, or cohorts of nonbanks, where the use of leverage can create financial stability risks (see Sections 3.3 and 4.2.2). Concentration measures, whether applied at entity or activity level, can target the amplification effects of concentrated leveraged exposures in certain markets or products (see Section 4.2.3). Authorities may also consider using supervisory guidance, where appropriate (see Section 3.4).

Where individual policy measures do not adequately address financial stability risks created by NBFI leverage in core financial markets, authorities should consider using combinations of complementary policy measures (see Section 4.6).

Authorities should review existing regulatory frameworks and consider whether new or additional policy measures are needed to address financial stability risks created by NBFI leverage in core financial markets. For example, where existing legal and regulatory frameworks do not provide

the necessary policy measures to address identified financial stability risks, authorities should consider adjusting or widening the scope of such frameworks, where appropriate. In some jurisdictions, this might require giving authorities new or enhanced powers (for example, from legislative or other governing bodies).

Authorities should also consider any potential unintended consequences of specific measures and, where identified, calibrate policy measures with the aim of minimising those unintended consequences. For instance, certain activity-based measures should be calibrated to avoid or minimise any unwarranted reduction in market liquidity or increase in transaction, funding and hedging costs. Entity-based measures should be designed to avoid undesirable risk-shifting behaviours, for example by complex nonbanks that can reallocate leveraged activities across different strategies and core markets.

Recommendation 5: When selecting policy measures to address financial stability risks from NBFI leverage in core financial markets, authorities should consider those that are most appropriate to the risks they identify, including both activity and entity-based measures, as well as concentration related measures. Authorities' choice of measures should be based on the risks they identify, taking into account the expected effectiveness and any potential costs or unintended consequences of the policy measures, as well as measures taken in other jurisdictions to address similar risks. Activity-based measures include (i) minimum haircuts or initial margin requirements in SFTs, including government bond repos, (ii) enhanced margin requirements between nonbanks and their derivatives counterparties, and (iii) increasing the use of central clearing in SFT and derivatives markets. Entity-based measures include (i) direct limits on leverage, and (ii) indirect leverage constraints linked to risks that nonbanks are exposed to. Concentration measures include (i) concentration add-ons for margins and haircuts in connection with exposures of nonbanks in derivatives and SFT markets, (ii) concentration and large exposure limits, and (iii) large position reporting requirements.

Where authorities, using their domestic risk identification and monitoring framework (see Section 4.1), identify financial stability risks created by NBFI leverage in core financial markets, they should consider policy measures that are most appropriate to the risks they identify from among those measures described below. Authorities should conduct appropriate analysis when selecting, designing and calibrating policy measures, to mitigate any unintended consequences. Authorities should tailor policy measures to the specific risks identified in their jurisdictions and aim to minimise cross-border arbitrage opportunities.

4.2.1. Activity-based measures

Minimum haircuts or initial margin requirements in non-centrally cleared SFTs backed by government securities

Where appropriate based on the risks they identify, authorities should consider minimum haircuts or initial margin requirements for non-centrally cleared SFTs backed by government securities, when used by nonbanks. In addition, authorities should fully implement the FSB regulatory framework for haircuts on non-centrally cleared SFTs, which excludes government bond repos.

Such activity-based measures can be effective where haircuts or margins imposed by leverage providers are not adequate to capture the financial stability risks created by NBFI leverage. This may be the case in certain government bond repo markets, where competitive pressures among

repo dealers or the mispricing of certain risks, such as concentration risk, may contribute to compression of haircuts to very low or even zero levels.

Minimum haircuts or initial margin requirements should be designed to be risk sensitive, capturing the market, counterparty and liquidity risk of the exposures, including the term of the SFT, the duration of the collateral and the riskiness of the SFT counterparty. These activity-based measures should be calibrated to address financial stability risks created by NBFI leverage, while minimising potential adverse effects, such as a reduction in market activity or liquidity, which could lead to an increase in transaction, funding or hedging costs.

Leveraged strategies used by nonbanks in non-centrally cleared SFTs backed by government securities often involve repo and reverse repo, or combinations of repo and derivative products transacted with the same counterparty. These may be subject to portfolio netting and cross-product margining arrangements. When portfolio netting and cross-product margining result in haircuts or margins that are not adequate to address financial stability risks from NBFI leverage, authorities could consider raising the level of margin collected on these netted exposures or applying limitations on cross-product margining. When doing so, authorities could take account of similar arrangements applied in centrally cleared SFT markets.

Depending on the specificities of the market structure in their jurisdiction, authorities should consider whether to implement minimum haircuts or initial margin requirements for non-centrally cleared SFTs backed by government securities via requirements on dealer banks or via market-wide regulations. Requirements on dealer banks can be effective where SFT markets are largely intermediated by bank-affiliated dealers, while market-wide regulations could be more effective where intermediation by nonbanks is more prominent.

Minimum haircuts or initial margin requirements are intended to act as a floor, and so market participants should still set haircuts and margins according to their internal risk management policies. Authorities may consider providing additional guidance to leverage providers, where appropriate, to improve their margin or haircut setting practices in line with the FSB qualitative standards.[28]

Enhanced margin requirements in derivatives markets

Where appropriate based on the risks they identify, authorities should review margin requirements for nonbanks engaging in leveraged strategies in non-centrally cleared derivatives markets, as well as clearing members' application of margin requirements to nonbanks in centrally cleared markets. In such cases, they should consider whether adjustments would be needed to prevent system-wide procyclical deleveraging and to improve liquidity resilience under stress, thereby further mitigating financial stability risks created by nonbank leverage.

Authorities may consider providing market participants with (additional) guidance on when and how they should increase margin levels (e.g. via add-ons) to reflect tail risks from procyclical nonbank deleveraging and contagion to other markets. Indeed, these risks, which may not be

[28] FSB (2015), *Transforming Shadow Banking into Resilient Market-based Finance: Regulatory framework for haircuts on non-centrally cleared securities financing transactions*, November.

fully captured in baseline margin requirements, can be significant when high volatility and amplification factors, such as concentration and interconnectedness, are present.

Where appropriate based on the risks they identify, authorities should also review the effects of existing exemptions from standard margin requirements for certain product types (e.g. wholesale energy derivatives and equity options) and entity types on financial stability risks created by NBFI leverage. Where such risks are identified, authorities should consider amending existing exemptions.

Authorities should satisfy themselves that any modification to the margining framework would not undermine the primary objective of mitigating counterparty credit risk nor the ability of market participants to anticipate margin calls for their own liquidity preparedness. They should also consider the potential for unintended adverse consequences, such as a reduction in hedging activity.

Increasing the use of central clearing in SFT and derivatives markets

Where appropriate based on the risks they identify, authorities should consider increasing the use of central clearing in SFT and derivatives markets that possess the appropriate degree of standardisation and sufficient liquidity. When considering measures to increase the use of central clearing in SFT and derivatives markets, authorities should consider to what extent the CCPs' proposed client access models and margining methodologies, including the scope of netting and cross-product margining arrangements, support the mitigation of financial stability risks created by NBFI leverage. Initial margin required by CCPs can be effective in addressing financial stability risks created by NBFI leverage where there is a requirement for CCPs' clearing members to pass the initial margin through to their clients.

Because CCP initial margin models can be more reactive to rises in market volatility than non-centrally cleared initial margin arrangements, authorities may consider complementary policies for mitigating liquidity stress. These could include supervisory guidance for strengthening the liquidity resilience of nonbanks, coupled with measures to mitigate the procyclicality of CCP initial margin models in line with existing international guidance, where appropriate. In addition, greater transparency across the clearing ecosystem (CCPs, clearing members, and clients) would help all stakeholders to be better prepared for periods of market stress, which can, in turn, reduce procyclicality.[29]

Authorities may choose to increase the use of central clearing by mandating it or by incentivising voluntary adoption, for example by prescribing minimum margin requirements in non-centrally cleared markets, which would lead to a more consistent treatment of similar risks.

[29] CPMI, IOSCO (2012), *Principles for financial market infrastructures*; CPMI, IOSCO (2017), *Resilience of central counterparties (CCPs): Further guidance on the PFMI – Final Report*; BCBS, CPMI, IOSCO (2024), *Transparency and responsiveness of initial margin in centrally cleared markets: review and policy proposals*.

4.2.2. Entity-based measures

Direct and indirect limits on leverage

Where appropriate based on the risks they identify, authorities should consider entity-based leverage limits to address financial stability risks from the build-up of leverage in individual nonbanks, or cohorts of such nonbanks, with a large footprint in core financial markets. Where appropriate, these limits should be implemented in a pre-emptive manner, to enhance resilience of leveraged nonbanks and reduce externalities to other entities or the broader financial system, e.g. from counterparty credit risk and procyclical deleveraging. The design of leverage limits should appropriately reflect the specificities of the type(s) of entities, while at the same time ensuring a consistent treatment of risks.

Where appropriate based on the risks they identify, authorities should consider direct leverage limits, e.g. expressed as a balance sheet ratio, distinguishing between nonbank types and accounting for different investment strategies. The choice and design of direct leverage limits should consider netting and hedging arrangements, off-balance sheet exposures, as well as ways to appropriately capture the use of financial and synthetic leverage.

Where appropriate based on the risks they identify, as an alternative or complement to direct limits, authorities should consider indirect leverage constraints linked to risks that nonbanks are exposed to. Such indirect, risk-based constraints should be informed by appropriate risk-sensitive metrics (see Recommendation 1) and aimed at ensuring that the entity remains resilient during extreme but plausible stress events. A recent example is the yield buffer requirement for GBP-denominated LDI funds (see Section 3.3). Indirect constraints may be more appropriate to address financial stability risks from more complex leveraged investment strategies, where risk sensitivities are not adequately captured by direct leverage limits.

When authorities choose to implement indirect leverage constraints, they should set appropriate risk tolerance levels, based on relevant risk metrics and scenario analysis, and also consider any potential unintended consequences that such constraints may have on other activities of affected market participants.

When defining entities in scope of leverage limits, authorities could consider several factors. For instance, existing regulatory definitions of entity types could be used to define the scope of policy measures. However, if risks to financial stability are related to leveraged investments in a specific type of asset (e.g. real estate), the scope could be more narrowly defined to include entities with predominant exposures to that specific type of asset. Entities in scope could also be defined in terms of their activities (e.g. liability driven investment, loan origination) to tailor entity-based measures to risks associated with specific activities.

Calibration of entity-based measures needs to balance risk mitigation with avoidance of unintended consequences for the beneficial aspects of NBFI leverage. For example, measures should be calibrated, where feasible, to avoid impeding nonbanks' ability to hedge their risks and to avoid adverse effects in markets where leveraged nonbanks are significant liquidity providers. When designing and calibrating entity-based leverage limits, authorities should rely on appropriate risk-sensitive metrics, tailored to the risks posed by different entities or by certain

products or segments of their portfolios. Calibration could be informed by entity-level stress testing to design entity-based limits that are appropriate to the desired level of resilience.

Any leverage constraints that authorities consider appropriate should be sufficiently flexible to preserve their effectiveness over time with respect to diverse strategies, products and asset classes that evolve dynamically, without requiring authorities to continuously re-adjust the policy response.

To mitigate procyclicality, authorities could allow for temporary breaches of the limits in times of stress. For example, 'soft limits' can serve as an early warning indicator, before 'hard limits' requiring immediate action are breached.

4.2.3. Concentration-related measures

In addition to the measures laid out above, there are some policy measures which can more directly target the build-up of concentrated leveraged exposures.

Concentration add-ons for haircuts and margins in SFT and derivatives markets

Requirements for concentration-related margin add-ons already exist within both centrally cleared and non-centrally cleared derivatives markets. On the former, clearing members are subject to stringent margin requirements by CCPs, including to manage concentration risk. On non-centrally cleared derivatives markets, the ISDA SIMM model incorporates concentration adjustments calibrated on the median liquidity of each asset category (e.g. large cap developed market equities). However, divergence in risk management practices across CCPs, as shown in certain annual CCP stress tests, could lead to margin requirements in centrally cleared markets not being calibrated to protect against the system-wide risks that large, concentrated exposures can generate.[30] Similarly, the ISDA SIMM used in non-centrally cleared markets relies on representative trading volumes for broad categorisations of risk exposures when calibrating incremental margin requirements for concentration risk, meaning it may not fully capture the idiosyncratic risks of specific concentrated risk exposures.

More generally, margin requirements are typically calibrated to mitigate counterparty credit risk and therefore may not fully capture the financial stability risks of procyclical deleveraging. Accordingly, authorities should review and, where appropriate, enhance the requirements for margin and haircut add-ons between nonbanks and their leverage providers in centrally cleared and non-centrally cleared SFT and derivatives markets, to ensure adequate coverage of concentration risks in core financial markets. Requirements for concentration add-ons may be enhanced through different means, including direct regulatory obligations, Pillar II requirements on bank leverage providers, or counterparty credit risk management guidelines.

[30] Recent Bank of England and ESMA annual stress tests noted that some CCPs faced potential vulnerabilities related to concentration risks. See ESMA (2024), *ESMA's stress test of Central Counterparties finds clearing system resilient* July; Bank of England (2024), *2024 CCP Supervisory Stress Test: results report*, November.

Large position reporting requirements

Where appropriate based on the risks they identify, authorities should consider requiring market participants to report large positions in specific asset classes or markets to authorities, to enhance their ability to identify and monitor the build-up of concentrated leveraged exposures. Regulatory reporting could avoid many of the adverse effects associated with public disclosure (see Recommendation 3). Authorities may consider calibrating the thresholds for such reporting based on the results of system-wide stress tests or liquidation cost analyses. Authorities may also consider imposing large position reporting requirements (e.g. on holdings of domestic government bonds or related derivative products) on all leveraged nonbanks, irrespective of their domicile, to ensure sufficiently comprehensive coverage and allow accurate identification and calculation of concentrated and crowded positions.

Concentration and large exposure limits

Where appropriate based on the risks they identify, authorities should consider concentration or large exposure (i.e. position) limits to complement other policy measures and/or act as a backstop, in cases where other policy measures do not effectively constrain concentration risks. Where appropriate, authorities should weigh the costs and benefits of introducing position limits for specific asset classes or markets, including both derivatives and SFT markets. In doing so, authorities would need to define the relevant markets or market segments to which the limits would apply, as well as calibrate the limits, potentially according to the results of system-wide stress tests or liquidation cost analyses.

Addressing crowded risk exposures

Structural or permanent constraints, such as enhanced margin requirements and position limits, may not be appropriate for addressing crowded risk exposures, which can be situational and temporary. Where appropriate based on the risks they identify, authorities should consider policy measures that are targeted in terms of scope (entities, activities) and duration. In such cases, authorities should also consider giving sufficient notice prior to implementation to reduce the risk that the sudden imposition of a policy measure triggers procyclical deleveraging. Given these challenges, authorities may prefer to provide supplemental market information or guidance to assist firms in managing crowded risk exposures, for example by making sector or system-wide stress test results available to market participants.

4.3. Interlinkages with systemically important financial institutions

NBFI leverage has the potential to create financial stability risks via interlinkages of leveraged nonbanks with systemically important financial institutions, including those that provide them leverage. The default or distress of a nonbank can therefore propagate stress to its systemically important counterparties, primarily through the counterparty default channel. Inadequate margining and counterparty credit risk management practices among its leverage providers can amplify the size of their potential and actual losses in these circumstances.

4.3.1. Counterparty credit risk management

Recommendation 6: Authorities should ensure the timely and thorough implementation of the BCBS's guidelines on counterparty credit risk, which represent an important element of a comprehensive policy response to financial stability risks created by NBFI leverage. Authorities should monitor, including from a systemic perspective, ongoing and future developments in the way NBFI leverage is provided to ensure that these guidelines and the overall regulatory framework remain appropriate for the consistent mitigation of financial stability risks.

Linkages between leverage providers and leveraged nonbanks represent a potentially significant amplification channel for financial stability risks created by NBFI leverage. As such, authorities should monitor these linkages on an ongoing basis. Furthermore, some of these linkages may involve nonbanks that not well covered by regulation, and whose financial stability risks may not easily be addressed by other policy measures, including some of those described in Recommendations 4 and 5. Therefore, leverage providers' risk management practices and rules governing the provision of leverage can play a key role in mitigating financial stability risks from NBFI leverage.

Against this backdrop, the FSB supports the full implementation of the BCBS Guidelines and the BCBS's call for strong counterparty credit risk management practices, particularly the need for banks' risk management practices to incorporate the quantity and quality of counterparty disclosure received.

4.3.2. Counterparty disclosure

Recommendation 7: Authorities, in cooperation with the FSB, should review the adequacy of existing counterparty disclosure practices made privately between leveraged nonbanks and leverage providers, including the level of granularity, frequency, and timeliness of such disclosures. Where appropriate, they should consider developing, in partnership with industry, mechanisms, standards and/or guidelines to enhance the effectiveness of disclosure practices. These should be designed to protect the confidentiality of sensitive information of leveraged nonbanks, while supporting the counterparty credit risk management of leverage providers.

Authorities should review existing information disclosure practices made privately between leverage providers and their nonbank counterparties and consider (i) the adequacy of the information shared (including completeness and timeliness) and (ii) the consistency of the data items and their comparability across counterparties and leverage providers. Where such practices are assessed to be inadequate for the purpose of leverage providers' counterparty credit risk management, authorities, in cooperation with the FSB, should consider establishing a public-private partnership with industry to develop standards and/or guidelines for the type of information to be provided by leveraged nonbanks to leverage providers.

This public-private partnership, incorporating both buy-side and sell-side views, could also explore the adoption of technology-based mechanisms that might enable leverage providers to manage risk and verify that counterparty exposures remain within agreed tolerances without compromising the confidentiality of their clients' proprietary investment strategies or positioning. Technology-based mechanisms may also allow a more efficient means of disclosing information, reducing implementation costs and operational burdens for market participants.

Industry stakeholders may also consider incorporating agreed mechanisms, standards and/or guidelines within standard documentation used throughout global derivatives and SFT markets to facilitate an efficient and globally consistent means of implementation.

The nature of information and data that leverage providers receive from their nonbank financial counterparties is heterogeneous, non-standardised, and may vary widely in both quality and quantity. This may partially reflect fundamental differences in the type of risks taken by different nonbank counterparties and proportionality considerations on the side of leverage providers. Nevertheless, the public-private partnership could explore the specificities of different types of nonbanks and their leveraged activities and consider the potential to harmonise data and metrics and standardise counterparty disclosure practices, where appropriate.

Taking into account the circumstances and existing regulations, the following principles should be considered, where appropriate, when developing standards and/or guidelines for the type of information to be provided by leveraged nonbanks to their leverage providers:

- Specific types of information and data disclosed should take account of the strategies, products and markets in which the counterparty is active, to ensure that the information provided is relevant and effective for the purpose of the leverage provider's risk management.

- Counterparties should provide aggregate information on their exposures across all entities or vehicles that are managed under a common strategy or decision-making process, to capture the impact of a coordinated liquidation across the counterparty's full range of related investment products or vehicles.

- The information disclosed to each leverage provider should be expressed in standardised metrics, wherever possible, potentially basing them on the metrics established by the public-private partnership or on the toolkit metrics, as set out in Recommendation 1 and in the Annex.

- Disclosures should grant leverage providers the necessary transparency to effectively manage risks, including concentration risks, while protecting the confidentiality of proprietary counterparty information. At a minimum, counterparties should provide information on the nature, scale and contours of their aggregate exposures and leverage in each major asset class, market or strategy. This may include the provision of internal risk assessments (e.g. stress test results) and/or information about the counterparty's risk management framework that covers such aspects.

- The information disclosed to each leverage provider should not typically require disclosure of individual positions. Disclosure should be limited to information that is relevant to the current and prospective risk exposure that the specific leverage provider has to the counterparty, considering concentration and expected correlations between exposure types.

- Disclosures should be proportionately granular, taking particular account of costs and operational burdens for smaller clients, and using a risk-based approach that incorporates the nature, scale and complexity of the risks that a given counterparty poses to its leverage provider.

- Counterparty disclosure standards/guidelines should avoid incentivising or otherwise inducing clients to consolidate or reduce the number of leverage providers they use, as this could reduce their resilience to counterparty default.

- Enhanced, more frequent, or more detailed disclosure may be required during periods of market stress, but standards/guidelines should recognise that, during times of heightened volatility, this may be more costly for counterparties to provide or for leverage providers to process.

A public-private partnership is expected to be best positioned to develop mechanisms, standards and/or guidelines that effectively enhance counterparty disclosure practices. However, should these efforts not result in a satisfactory outcome, authorities could consider the benefits of mandating a minimum set of standard disclosure requirements to ensure leverage providers' visibility on aggregate leveraged positions. These requirements could apply to leverage users to support the provision of sufficient quality information to their leverage providers and the harmonisation of the data exchanged.

4.4. Addressing incongruences in regulatory treatment of NBFI leverage

Recommendation 8: Authorities should identify instances where various forms of NBFI leverage provision are subject to incongruent regulatory treatments which may result in regulatory arbitrage that can increase financial stability risks. Where such incongruences are identified, authorities should analyse the underlying causes to determine whether and how to address the identified incongruences, having regard to the treatment of similar situations in other jurisdictions, so that domestic remediation efforts do not create new disparities that could transfer risk across borders.

Authorities should regularly review their regulatory frameworks to identify incongruences in the regulatory treatment of how leverage is provided to nonbanks which may distort incentives amongst otherwise similar exposures, financial instruments or structures. Such incongruences can create opportunities for regulatory arbitrage that increase the use of NBFI leverage or cause the migration of activities to less regulated, more opaque or riskier parts of the system. The authority's review should focus on the diverse modalities in which leverage is provided to nonbanks and how these different modalities can pose (the same or similar) financial stability risks. The domestic risk identification and monitoring framework should assist the review to uncover potential instances of regulatory arbitrage (see Recommendation 1) in the different ways through which leverage is provided to nonbanks.

When assessing incongruence of regulatory treatment, authorities should have regard to the specific characteristics of different (i) product types (e.g. SFTs and derivatives), (ii) counterparty arrangements (e.g. centrally cleared and non-centrally cleared transactions), and (iii) financing arrangements (e.g. synthetic vs securities-based financing structures), all of which may justify differential regulatory treatment. Authorities may also consider the nature of the nonbanks using the products or arrangements, including whether the nonbank is already subject to regulatory requirements that may have direct or indirect impact on its leverage.

Where such incongruences are identified, authorities should investigate the underlying causes to determine whether and how to address the identified incongruences. When doing so, authorities may consider conducting cost-benefit analyses to help inform their response. When

acting to promote congruent treatment within their jurisdiction, authorities should also have regard to the treatment of similar instruments or structures in other jurisdictions (and the actions or intentions of relevant authorities), so that domestic remediation efforts do not create new disparities that could transfer risk across borders.

4.5. Cross-border cooperation

Episodes of market stress (see Section 2.2) have shown how effective cross-border cooperation can result in more closely integrated cross-border risk monitoring, as well as more efficient and aligned policy responses that can help mitigate regulatory arbitrage and cross-border spillovers. Successful examples of cross-border cooperation include the conduct of joint supervisory reviews by bank prudential authorities following stress events involving Archegos and the LME nickel market, and the multi-jurisdiction response to the LDI crisis in the UK Gilt market. In the former, supervisors from the Federal Reserve, the Bank of England's Prudential Regulatory Authority and the Banking Supervision of the European Central Bank worked closely alongside other relevant authorities to undertake a deep dive review of lessons learned from each event, leading to updated supervisory guidance on banks' counterparty credit risk management processes and informing the subsequent work of the BCBS. In the LDI case, authorities in the UK, Ireland, and Luxembourg, as well as ESMA, coordinated information exchange and supervisory oversight at the height of the crisis. The authorities also cooperated in the aftermath of the crisis on consistent resilience standards for GBP-denominated LDI funds in Ireland and Luxembourg, and on pension schemes investing in LDI funds in the UK.

Recommendation 9: When addressing financial stability risks created by NBFI leverage that may emanate from, transmit to, or otherwise impact markets and market participants in other jurisdictions, authorities should engage proactively with their peers to facilitate coordinated crisis and/or policy responses, to the extent legally and operationally feasible. Where they determine that doing so would assist in their ability to identify and assess relevant cross-border risks, authorities should proactively work to establish information sharing agreements, such as MoUs, and regular communication channels or engagement processes, especially in crisis periods. Authorities should also share aggregate data on leverage in key nonbank sectors on a best-efforts basis and use harmonised data and metrics where possible when exchanging information with each other.

Effective international cooperation is essential in supporting authorities' efforts to mitigate the financial stability risks that NBFI leverage can create, as a significant amount of NBFI leverage is provided on a cross-border basis. Therefore, authorities are strongly encouraged to engage with their peers when addressing risks that may emanate from, transmit to, or otherwise impact markets and firms in other jurisdictions. To the extent legally and operationally feasible, this engagement should facilitate coordination (e.g. in risk monitoring or crisis response) and/or collaboration (e.g. in supervision or policymaking).

Heterogeneous regulatory frameworks may not empower authorities in different jurisdictions to use the same types of policy tools to address similar risks, and hence jurisdictions may be unable to fully harmonise policy responses. Authorities should therefore consider that the introduction and calibration of policies to address financial stability risks created by NBFI leverage in one jurisdiction could adversely impact other jurisdictions, including by leading to cross-border regulatory arbitrage, which could transmit those risks across borders.

Information sharing arrangements, such as MoUs, set out the legal preconditions for exchanging information under authorities' respective frameworks, as well as the confidentiality protections and use restrictions for the information shared, among other issues. Accordingly, the nature and depth of international cooperation amongst authorities is likely to differ according to its context. For example, during a crisis the severity of risk materialisation and the urgency to take action would be such that the legal conditions required for sharing sensitive firm-specific data or information with other authorities would more likely be met. Similarly, where an authority has identified a material firm-specific risk with cross-border implications, having an information-sharing arrangement in place can facilitate the sharing of relevant firm-specific data or information in compliance with authorities' legal obligations. In business-as-usual conditions, where the threshold for firm-specific data sharing may not be met, authorities may still find value in sharing high-level information or discussing aggregated data with international peers on a regular basis, for example via a standing engagement process as a part of horizon scanning or financial sector monitoring.

There are several steps authorities can take to improve the effectiveness of international cooperation, given existing impediments. First, authorities should consider proactively establishing information sharing arrangements, such as MoUs, with key partner authorities to ensure that there are arrangements in place for efficient engagement during normal times, as well as when stressed conditions arise. Whether authorities enter an MoU is likely to be based on several factors that fall within each authority's discretion, including a determination of whether entering an MoU would assist both authorities' ability to assess and address relevant risks. Second, authorities should consider establishing regular communication channels or engagement processes with key peers for the purpose of sharing high-level aggregate data and information on leverage in normal market conditions (subject to confidentiality limitations), so that the channels and processes are well developed and can be easily adapted for use in stressed conditions. These engagements may be formal or informal, frequent or infrequent, depending upon authorities' objectives and legal constraints. Finally, authorities would benefit from the harmonisation of key data and metrics that could be exchanged more seamlessly and efficiently in both normal and stressed conditions (see Recommendation 1).

Enhanced bilateral arrangements could be complemented by enhanced international cooperation through multilateral dialogue and high-level information sharing amongst authorities. For example, multilateral cross-authority dialogue, in normal times or during market stresses, could facilitate discussion on risks to financial stability. Similarly, collection of information across jurisdictions on policy approaches and monitoring practices in respect of financial stability risks created by NBFI leverage could be compiled and disseminated amongst member authorities to inform best practice.

4.6. General principles for the selection, design, and calibration of policy measures

Financial stability risks created by NBFI leverage can vary across jurisdictions. Therefore, the policy measures included in the recommendations may operate in different ways or be effective for some, but not all, nonbanks that use or provide leverage within a jurisdiction. In addition, certain jurisdictions may already have some policy measures in place to address financial stability risks from NBFI leverage. While policy responses will vary across jurisdictions for these

reasons, the following general principles provide a helpful guide for authorities to consider, where appropriate, when selecting, designing and calibrating policy measures:

Selection

- Authorities' choice of policy measures should be based on the nature and drivers of identified risks in their jurisdiction, taking into account the effectiveness and any potential costs or unintended consequences of each measure.

- Authorities should consider combining policy measures that are complementary. Authorities should evaluate the potential for new policy measures to complement existing measures and achieve a more comprehensive and coherent approach.

- Authorities should have regard to policy measures taken in other jurisdictions to address similar risks, to prevent or mitigate potential cross-border spillovers and regulatory arbitrage where they can create financial stability risks.

Design and calibration

- Authorities should clearly define activities and entities in scope of selected policy measures, taking into account their respective risk profiles. The scope of policy measures should be determined proportionately, which requires assessing the specific characteristics, activities and risk exposures of different types of nonbanks.

- Policy measures should be calibrated to mitigate financial stability risks created by NBFI leverage while minimising potential adverse effects on market liquidity and hedging capacity.

- Authorities should consider policy measures that align the incentives of nonbanks with financial stability objectives. This involves designing policies that promote appropriate risk management practices.

- Policy measures should be sufficiently flexible so that they can remain effective if the underlying risk landscape changes; for example, authorities should be able to re-design or re-calibrate them to reflect new risks or financial innovation.

- In cases where policy measures have historically been used for a different purpose, authorities should consider any necessary updates to their design or calibration to achieve the intended outcome.

- Authorities should periodically review the adequacy and effectiveness of policy measures taken and assess their impact, including considering potential unintended consequences on the broader financial system. This involves evaluating both direct and indirect effects on the provision of financial services and risk taking. Authorities should adjust the scope and calibration of measures when necessary to ensure their continued adequacy and effectiveness.

Complementarities of policy measures

Given the complex nature of financial stability risks created by NBFI leverage and the differences in how the various policy measures operate, in many cases a single policy measure in isolation may have limited effectiveness. Combinations of measures may therefore be more effective. For example, public and counterparty disclosures provide market participants with important information about risk exposures and thereby support the application of supervisory guidance on counterparty and liquidity risk management. Disclosures can also support the application of activity-based measures, by providing market participants with additional information that can be used, for example, to design and calibrate concentration add-ons or other risk management controls on top of margin requirements. Furthermore, regulatory reporting may inform authorities' calibration of entity-based measures.

Activity-based and entity-based measures can reinforce each other, for instance, by allowing authorities to target policy at specific cohorts of entities while also applying market-wide risk mitigation requirements for leveraged activities. Activity-based measures, by requiring entities to set aside margin against certain leveraged investments and strategies, irrespective of the type of entity involved, can complement other measures by targeting all types of entities engaged in specific investments or strategies that can create financial stability risks from leverage in core financial markets. Activity-based measures most effectively complement other measures when their design helps constrain the risks of leveraged strategies, particularly in situations where other measures may be impractical or insufficient to specifically target these risks. In turn, entity-based measures, by targeting certain entities (or cohorts of entities), can be directed specifically at those market participants whose leveraged positions generate financial stability risks, complementing other measures that are applied market-wide and/or to all market participants, but which may not be sufficiently binding for the most relevant entities.

Entity-based and activity-based measures do not directly target the amplification effects of concentration and crowdedness. While entity-based measures can be targeted to a specific subsector of nonbanks engaging in similar behaviour, leading to collectively highly concentrated positions in core markets, entity-based measures may not restrict crowdedness and concentrated leveraged exposures when these are held across a range of entity or asset types. On the other hand, activity-based measures, such as margin requirements or measures that increase the use of central clearing, may not constrain strategies that involve concentrated positions in a market or a market segment, unless counterparties and CCPs can identify the exposures, recognise their concentration and calibrate sufficient add-ons. Therefore, measures that focus specifically on concentration, such as margin concentration add-ons, large exposure limits and large exposure reporting requirements, complement both activity and entity-based measures. In addition, public or counterparty disclosures aimed at improving transparency limit the potential for leverage to remain hidden, and therefore also complement activity, entity and concentration-based measures.

Supervisory guidance provides a flexible approach to implementing policy measures, mainly at the entity level. It can also be used to address the imminent materialisation of risks from NBFI leverage within a short time frame, for instance, by bridging the time until new rules are formally codified. In this sense, supervisory guidance can complement authorities' policy toolkit. But to the extent that the focus of supervisory guidance is of a micro-prudential nature, i.e. to improve individual firms' liquidity or counterparty risk management, guidance cannot be a substitute for regulatory measures when addressing risks from NBFI leverage.

Annex 1: NBFI leverage and recent episodes of stress

Event	Cause	Response
March 2020 “dash for cash”	Lack of supervisory guidance on maximum leverage for investment funds Ability of funds to transact with near-zero haircuts in government bond repo markets Leverage providers lacking visibility into client strategies (possibly a gap in risk governance and know-your-client practices)	Mandatory central clearing for US treasuries and Treasury repo
March 2021 “Archegos default”	Fraud and manipulation Mispriced counterparty credit risk NBFI outside regulatory perimeter	International guidance for counterparty credit risk management Supervisory guidance Security-based swap regime in the US
2022, “commodities market stress”	Lack of disclosure between counterparties Exemptions from bilateral margin and transaction reporting requirements Lack of transparency on OTC disclosures	Weekly reporting of OTC exposures to LME Daily price increase limits on LME
September 2022, “LDI crisis”	Shortcomings in banks’ and LDI managers’ risk management and operational processes Margining and collateral arrangements including near-zero haircuts in bilateral Gilt repo Lack of public disclosure of concentrated positions in Gilt markets Lack of appropriate concentration and wrong-way risk margin add-ons or entity-based constraints	Yield-buffer for GBP-denominated LDI funds in Ireland, Luxembourg, and the UK

Annex 2: Risk metrics to monitor financial stability risks related to NBFI leverage

Financial stability risks created by NBFI leverage are multifaceted. Therefore, the FSB proposes a suite of metrics, which in many cases complement each other. Toolkit metrics seek to assess four different dimensions of risks (see also Section 4.1.1).

Leverage metrics

This set of metrics seek to measure aggregate exposures acquired through financial and synthetic leverage. These metrics are defined as the ratio of various measures of exposure to the entity's loss-absorbing capacity, e.g. equity capital for insurers or NAV for investment funds, which serve as a buffer against potential loss.

- **Gross leverage** measures the ratio of the entity's gross exposures to capital or NAV.[31] For example, IOSCO (2019) defines gross exposures of investment funds the sum of the absolute values of the notional amounts of a fund's derivatives and the value of the fund's other investments. Gross leverage can be decomposed into:
  - **Gross financial leverage,** which is the ratio of the entity's gross exposures (excluding derivatives) to its capital or NAV. Financial leverage can stem from several types of funding, including secured borrowing (such as repo), prime brokerage or unsecured loans.
  - **Gross synthetic leverage,** which is the ratio of the absolute sum of gross notional amounts of the entity's derivatives positions to its capital or NAV.
- **Adjusted leverage** refines gross leverage measures to reflect the type of the underlying economic exposures. For certain asset classes, such as interest rate derivatives, notional amounts may overstate the actual economic exposures acquired through those instruments. In these cases, notional amounts can be adjusted by duration to provide a better reflection of their actual economic exposure.
- **Net leverage** refines gross or adjusted leverage measures to reflect any netting and hedging arrangements.[32] Net leverage can complement gross and adjusted leverage measures, which do not provide information on the directionality of an entity's positions or its use of derivatives for hedging purposes.

Collateralisation, margins and liquidity risks related to leverage

This set of metrics seeks to capture default and liquidity risks related to the use of leverage. Collateralisation and margining indicators measure the adequacy of existing arrangements to cover counterparty risk, as well as the entity's ability to withstand funding liquidity risk related to spikes in margin and collateral calls, or to rollover its financing. These shocks, which originate

[31] Gross leverage does not account for netting or hedging positions and can overstate actual economic risk

[32] For further details, see Appendix B in IOSCO (2019).

from increases in the liquidity demands on derivatives positions and secured borrowing and mark-to-market losses, represent a liquidity risk that can trigger the default of the entity.

- **Initial margins ratio** captures the ability of the entity to absorb losses before defaulting. It is calculated as the ratio of the sum of all initial margins posted on derivative exposures to the entity's capital or NAV. Initial margins are aimed to cover potential future exposures and are a measure of market risks for counterparties.

- **Haircut ratio** captures the market value of pledged collateral to total repo borrowings of the entity. Lower haircuts on collateral can increase risks from leverage, particularly in times of stress, if collateral value falls.

- **Ratio of initial margins to cash (or highly liquid assets)** captures the ability of the entity to meet margin calls on its derivative exposures by using unencumbered cash. Other highly liquid assets may also be considered in this ratio.

- **Roll-over risk** can be expressed as the ratio of maturing borrowings to available liquidity (i.e. assets that can be mobilised to replace the loss of funding sources) or financing liquidity (i.e. existing arrangements that the entity can use to obtain funding). Measures of roll-over risk across time buckets (e.g. one day, 2- 7 days etc.) allow for a more comprehensive assessment of financing risks for the entity.[33]

Sensitivity to market risk

This set of metrics, which include risk sensitivities and standardised stress test results, seeks to measure the impact of potential changes in market conditions on the capital or the NAV of the entity.

- **Risk sensitivities** are typically calculated as the impact of a given change in a specific risk factor on the capital or NAV of the entity. Risk sensitivities are typically captured by the change in market value related to a change in the underlying factor (such as 'delta') and can be expressed as DV01 ($ impact of a one basis point change in interest rates) or CS01 ($ impact of a one basis point change in credit spread). Risk sensitivities generally reflect the impact of a very small change (e.g. one basis point or one per cent) and therefore fail to capture the potential impact over larger market moves of products with non-linear payoffs.

- **Standardised stress test results** are typically calculated as the impact of a stress scenario (including significant changes to multiple risk factors) on the capital or NAV of the entity, therefore capturing the non-linear impact over larger market moves that cannot be extrapolated from the risk sensitivities to given shocks (see above)**.** For example, stress test parameters might include: (i) equity prices increase/decrease by 5/20%, (ii) risk free rates increase/decrease by 25/75 bps and/or (iii) default rates increase/decrease by 1/5 percentage points. When stress test scenarios are standardised, i.e. they are defined consistently across entities, authorities can

[33] Time buckets typically range between one day to 365 days, but for some investment funds, such as real estate or private equity funds, time buckets beyond 365 days might also be relevant.

aggregate the results to estimate the impact of the scenario on a group of entities, on a sector or the financial system.

- **Other metrics** can provide additional information about market risks at entity-level but cannot be aggregated across firms. Such measures include:

  - **Reverse stress tests results** are expressed as the minimum size of the shock to a specific risk factor (or combination of factors) that would bring about the default of the entity. Reverse stress tests identify thresholds at which entities default and therefore inform risk management by focussing on extreme scenarios that may not be captured by standardised stress tests.

  - **Potential loss measures** include metrics such as Value-at-Risk (VaR) and Expected Shortfall (ES), which measure the expected losses for the entity over a given time horizon and confidence interval, typically based on historical data.[34] Consistent definitions of VaR and ES, e.g. with respect to time horizon and the confidence level, allow authorities to better compare risks across entities. These metrics cannot be directly aggregated across entities, since calculation methods might differ (e.g. historical VaR, parametric or Monte Carlo VaR). In addition, the relevant risk factors that generate expected losses are usually different across entities with different investment strategies.

  - **Historical risk and performance measures**. For investment funds, these include the maximum drawdown over a given time range (defined as the peak-to-trough performance) and the historical volatility of the fund's shares. They both provide indirect information on the use of leverage. Regulatory reporting reflects the state of an entity's holdings at a specific date and is susceptible to window-dressing. Therefore, including historical realized risk and performance within regulatory reporting may provide insights on the potential use of leverage in-between reporting dates and trigger further supervisory action.

Concentration risk and crowdedness metrics

This set of metrics seeks to cover multiple dimensions of risks from concentration and crowdedness and can typically be aggregated across groups of entities to assess market-wide risks.

- **Market footprint** is defined as the ratio between an entity's (or group of entities') exposures and the total size of the relevant underlying market.

- **Portfolio concentration** metrics capture the diversification of an entity's portfolio and the proportion of its capital or NAV that is exposed to individual risks, such as specific instruments, asset types or risk factors. Concentration metrics can compare the entity's exposures to measures of market liquidity (such as average daily trading volumes) to incorporate liquidation risk.

[34] These measures cannot capture the type of risks that have not materialised over the observation period.

- **Portfolio overlap and crowdedness** metrics measure the portfolio similarity across a group of entities pursuing similar strategies. They seek to aggregate exposure to specific instruments, asset types or risk factors across cohorts of similar entities and compare those exposures to the size of the relevant underlying market.

- **Counterparty concentration** captures the size and the share of the entity's exposure to individual counterparties. They can be calculated based on actual credit exposures or potential future exposures in the event of a counterparty's default.