FSB FINANCIAL STABILITY BOARD

Leverage in Non-bank Financial Intermediation

Consultation report

18 December 2024

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Questions for consultation

The FSB is inviting comments on this consultation report and the questions set out below. Responses should be submitted via this **secure online form** by 28 February 2025.

Please contact the FSB by email (fsb@fsb.org) if you have questions or if you wish to provide supplementary material.

Responses will be published on the FSB's website unless respondents expressly request otherwise on the online form.

Background

This consultation report presents the outcome of the FSB's analysis and consults on proposed policy recommendations to monitor and address financial stability risks from leverage in non-bank financial intermediation (NBFI). Entities in scope are non-bank financial firms that use leverage, either financial or synthetic, 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.

Questions

Recommendation 1

1. Is the description of the financial stability risks from leverage in NBFI accurate and comprehensive? Are there additional vulnerabilities or risk dimensions related to NBFI leverage that authorities should consider for monitoring purposes?
2. What are the most effective risk metrics that should be considered by authorities to identify and monitor financial stability risks arising from NBFI leverage?
3. What are the most effective metrics for the monitoring of financial stability risks resulting from

   (i) specific market activities, such as trading and investing in repos and derivatives?

   (ii) specific types of entities, such as hedge funds, other leveraged investment funds, insurance companies and pension funds?

   (iii) concentration and crowded trading strategies?

Recommendation 3

4. What types of publicly disclosed information (e.g. transaction volumes, outstanding amounts, aggregated regulatory data) are useful for market participants to enhance their liquidity or counterparty credit risk management? Are there trade-offs in publicly disclosing such information and, if so, what would be the most important elements to consider? What is the appropriate publication frequency and level of aggregation of publicly disclosed information?

Recommendation 5

5. Do Recommendations 4 and 5 sufficiently capture measures that would be used to address the scope of non-bank financial entities under consideration in this report? In what ways may the policy measures proposed in the consultation report need to be adjusted to account for different types of non-bank financial entities?
6. In what circumstances can activity-based measures, such as (i) minimum haircuts in securities financing transactions, including government bond repos, (ii) enhanced margin requirements between non-bank financial entities and their derivatives counterparties, or (iii) central clearing, be effective in addressing financial stability risks related to NBFI leverage in core financial markets, including government bond markets? To what extent can these three types of policy measures complement each other?
7. Are there benefits to dynamic approaches to minimum margin and haircut requirements, e.g. where the requirements change based on changes in concentration or system-wide leverage? If so, what types of indicators capturing concentration or system-wide leverage should the requirements be linked to?
8. Are there any potential unintended consequences from activity-based measures beyond those identified in the consultation report?
9. For non-centrally cleared securities financing transactions, including government bond repos, what are the merits of margin requirements compared to minimum haircuts?
10. In what circumstances can entity-based measures, such as (i) direct and (ii) indirect leverage limits be effective in addressing financial stability risks related to NBFI leverage in core financial markets?
11. Are there ways to design and calibrate entity-based measures to increase their risk sensitivity and/or their effectiveness in addressing financial stability risks from NBFI leverage?
12. Are there any potential unintended consequences from entity-based measures beyond those identified in the consultation report?
13. To what extent can activity-based and entity-based measures complement each other? What are the main considerations around using these two types of measures in combination?

Recommendation 6

14. How could counterparty credit risk management requirements for leverage providers be enhanced to be more effective in addressing financial stability risks from NBFI leverage in core financial markets, such as government bond repo markets? In what circumstances can they be most effective?

Recommendation 7

15. Would a minimum set of disclosures to be provided by leverage users to leverage providers be beneficial in improving counterparty credit risk management and reducing financial stability risks from NBFI leverage, including concentration risks? If so, which

types of information and what level of granularity should (and should not) be included in this minimum set and why?

16. What are the main impediments that leverage users face in sharing additional or more granular data with their leverage providers? Is there a risk that a minimum recommended set of disclosures may lead leverage users to limit the information they share with their leverage providers to that minimum set?
17. Should such a minimum set of disclosures rely on harmonised data and metrics to ensure transparency and efficiency in the use of such information for risk management purposes? Do respondents agree that such a minimum set of disclosures should be based on the list of principles outlined in the consultation report? If not, which principles should be added, deleted or amended?
18. Should leverage users be required or expected to provide enhanced disclosures (beyond that provided in normal market conditions) to their leverage providers during times of stress?
19. Should authorities design a minimum set of harmonised disclosures and guidelines on its application, or should they convene a cross-industry working group to do so? How do respondents believe such a standard should be incorporated into market practice? Through regulation, supervisory guidance, and/or via a Code of Conduct or similar approach?

Recommendation 8

20. Are there areas where the principle of “same risk, same regulatory treatment” should be more consistently applied? Are there circumstances in which the principle should not apply or should not apply comprehensively?

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Executive summary

This consultation report sets out the Financial Stability Board's (FSB) analysis and proposed policy recommendations to address financial stability risks arising from leverage in non-bank financial intermediation (NBFI). Building on the findings of the 2023 FSB report on The Financial Stability Implications of Leverage in Non-Bank Financial Intermediation (NBFI leverage report), the proposed policy recommendations aim to enhance the ability of authorities and market participants to monitor vulnerabilities from NBFI leverage, contain NBFI leverage where it may create risks to financial stability, and mitigate the impact of these risks.

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. The proposed policy recommendations herein complement the FSB's recommendations to enhance the liquidity preparedness of non-bank market participants for margin and collateral calls during times of market-wide stress, as well as the work of the standard-setting bodies (SSBs), such as the Basel Committee on Banking Supervision (BCBS) work on counterparty credit risk management and 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.

The NBFI leverage report found that NBFI leverage played a significant role in recent 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. Certain factors, which include interconnectedness, concentration and liquidity imbalances can amplify vulnerabilities related to leverage and accelerate and magnify disruptions that leverage can generate within the financial system. Overall, NBFI leverage can create financial stability risks particularly in financial markets that are at the core of the financial system, and whose functioning is essential for the real economy.

The proposed recommendations that follow are addressed to FSB member authorities and SSBs and focus on markets, entities, and activities where NBFI leverage may give rise to financial stability risks. Given the complex nature of financial stability risks arising from NBFI leverage and the differences amongst how various policy measures operate, the consultation report recognises that combinations of measures - chosen depending on the market structure and the risks from NBFI leverage relevant in each jurisdiction - will likely be more effective in addressing these financial stability risks.

Authorities should select, design and calibrate policy measures as necessary to give them confidence that underlying vulnerabilities and financial stability risks arising from NBFI leverage would be sufficiently addressed. To this end, the FSB and SSBs will undertake further work to support and assist authorities in applying the recommendations, including developing guidance regarding the operationalisation of certain recommendations, where appropriate.

The first three proposed recommendations relate to risk identification and monitoring. Recommendation 1 emphasises that authorities should have a domestic framework to identify and monitor vulnerabilities related to NBFI leverage, and their associated financial stability risks, in an effective, frequent and timely manner. Authorities should review their domestic framework to

assess data challenges. They should consider how to address them and where appropriate collaborate through the FSB and SSBs to reduce those that may hinder the effective cross-border monitoring of vulnerabilities (Recommendation 2). Recommendation 3 proposes that authorities should 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.

Proposed recommendations 4 and 5 relate to NBFI leverage in core financial markets. Recommendation 4 states that authorities should take steps to address the financial stability risks from NBFI leverage that they identify in core financial markets. 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 (Recommendation 4). When selecting policy measures, authorities should evaluate a wide range of measures, including both activity- and entity-based measures, as well as concentration-related measures. Authorities' choice of measures should be based on the nature and drivers of identified risks, taking into account the effectiveness and any potential costs or unintended consequences, as well as measures taken in other jurisdictions to address similar risks (Recommendation 5).

Proposed recommendations 6 and 7 relate to counterparty credit risk management. Recommendation 6 calls for authorities to ensure the timely and thorough implementation of the BCBS's revised guidelines on counterparty credit risk for bank leverage providers, which represents an important element of a comprehensive policy response to financial stability risks stemming from NBFI leverage. Authorities, in cooperation with SSBs, should review the adequacy of existing private disclosure practices between leveraged non-bank financial entities and leverage providers, including the granularity, frequency, and timeliness of such practices (Recommendation 7). Where appropriate, they should consider developing mechanisms and/or minimum standards to enhance the effectiveness of these disclosure practices.

Proposed recommendation 8 emphasises that authorities should adopt the principle of "same risk, same regulatory treatment" and identify incongruences in the regulatory treatment of NBFI leverage resulting from similar exposures, financial instruments or structures that may distort incentives and result in regulatory arbitrage. Where incongruences are identified, authorities, in cooperation with SSBs, should analyse the underlying causes to determine whether and how to address the identified incongruence, 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.

Finally, proposed recommendation 9 emphasises the importance of cross-border cooperation and coordination. When addressing 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 (Recommendation 9). To enhance system-wide risk monitoring across jurisdictions, authorities should proactively establish information sharing agreements, such as through Memorandums of Understanding (MoUs), and regular communication channels or engagement processes, where they determine that doing so would assist in their ability to identify and assess relevant market risks, especially during crises. Authorities should also share aggregate data on leverage (subject to confidentiality limitations) in key non-bank sectors on a best effort basis and make use of harmonised data and metrics as much as possible when exchanging information.

1. Introduction

In 2023, the FSB published a report on the financial stability implications of leverage in non-bank financial intermediation (NBFI), which discussed the vulnerabilities associated with NBFI leverage, including propagation and amplification mechanisms, and associated financial stability risks.[1]

This consultation report builds on the findings of the 2023 'NBFI leverage report' and proposes policy recommendations to address financial stability risks from NBFI leverage. The recommendations are targeted at FSB member authorities and standard setting bodies (SSBs) and aim to enhance authorities' and market participants' ability to monitor vulnerabilities from NBFI leverage, contain NBFI leverage where it may create risks to financial stability, and mitigate the impact of these risks. Entities in scope are non-bank financial entities that use leverage, either financial or synthetic, 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.[2]

The FSB and SSBs will undertake further work to support and assist authorities in applying the recommendations, including developing guidance regarding the operationalisation of certain recommendations, where appropriate.

This work 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 economy and reduce the need for extraordinary central bank interventions.[3] This would be achieved by reducing excessive spikes in the demand for liquidity, strengthening the resilience of liquidity supply in stress, and 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 non-bank market participants for margin and collateral calls during times of market-wide stress.[4] In addition, the 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 non-bank financial entities.[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 consultative reports in 2024.[6]

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1 FSB (2023), *The Financial Stability Implications of Leverage in Non-Bank Financial Intermediation*. Henceforth, 2023 NBFI leverage report.

2 Financial Market Infrastructures (FMIs), such as central counterparties (CCPs), are non-bank financial entities that are excluded from the meaning of "leveraged non-bank financial entities" as well as "leverage providers" for the purposes of this report.

3 FSB (2024), *Enhancing the Resilience of Non-Bank Financial intermediation*, 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, CMPI, IOSCO (2022), *Review of margining practices* , September; BCBS, CPMI, IOSCO (2024), *Transparency and responsiveness of initial margin in centrally cleared markets*, January; BCBS, IOSCO (2024), Report on streamlining VM processes and IM responsiveness of margin models in non-centrally cleared markets, January; CPMI, IOSCO (2024), *Streamlining variation margin in centrally cleared markets – examples of effective practices*, February;

2. NBFI leverage and financial stability risks

2.1. Leverage in the financial system

Leverage is a financial technique used to increase exposures, boost returns or take positions that can offset potential losses from other exposures (hedging). Leverage can take different forms. It can be 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 the balance sheet of investors (e.g. loans or bonds) or off-balance sheet, e.g. by holding shares in investment vehicles that use leverage techniques or in special purpose vehicles created to finance the origination of risky assets.

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 non-bank financial entities may use leverage to finance these activities and enhance returns offered to their equity investors. Leverage is also utilised to invest in certain trading strategies that support price discovery by arbitraging price discrepancies. Certain activities that market participants undertake to manage risks and hedge positions, e.g. through use of insurance or derivatives, also have the effect of generating leverage. Overall, these activities can enhance efficiency and support liquidity in financial markets.

Leverage in NBFI may also play an important role in liquidity transformation, allowing certain non-bank financial entities to provide liquidity to investors in otherwise illiquid investments. The use of leverage, including in NBFI, may in some cases allow entities to meet short-term cash flow needs without having to engage in asset sales.

However, the build-up of leverage can pose significant risks to financial stability, if not properly managed. The propagation of shocks through leverage occurs primarily via two channels: the position liquidation channel and the counterparty channel. The position liquidation channel operates when leverage leads to large or unexpected liquidity demands from collateral or margin calls, prompting leveraged entities to sell assets to raise funds. Deleveraging and asset sales can happen also when investors aim to maintain a target level of leverage on their balance sheet or seek to have a stable value-at-risk in their portfolio. Ensuing asset sales, especially under stressed market conditions, can depress asset prices further, causing a feedback loop of additional liquidity demands and sales across market participants exposed to the same asset class.

The counterparty channel involves the default or the distress of significant leveraged entities, which can impose direct losses on their counterparties, leading to a cascade of financial stress and 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 impacted the leveraged entity's capital. In this case, an initial shock could be propagated to the entity's counterparties. If the counterparties are not sufficiently resilient to absorb losses due to the default, they may experience financial distress, and the shock could potentially propagate even more broadly. Shocks might also propagate without a default, if, due to the shock, the counterparties of the affected entity decide to reprice or withdraw their financing. This could create funding stress for the entity that could cascade to other

counterparties, especially if its leveraged positions have a short-term maturity and need to be constantly rolled over.

Several factors determined by the structure of the markets and investor behaviour can amplify vulnerabilities related to leverage and accelerate and magnify disruptions that leverage can generate within the financial system, including interconnectedness, concentration and crowdedness, and liquidity imbalances. The degree to which a leveraged entity is interconnected and exposed to concentrated risks, both in terms of the number of its counterparties and the scale of its exposures across different assets/markets affects the extent to which other entities rely on them as a source of financing or hedging and determines the likelihood and magnitude of losses that could propagate through the financial system.

2.2. Leverage in NBFI

This report focuses on leverage in NBFI where it can create financial stability risks. The 2023 FSB's NBFI leverage report found that both financial leverage and synthetic leverage are present but are unevenly distributed in the NBFI sector. While insurance companies, pension funds and investment funds represent two-thirds of NBFI assets, most on-balance sheet financial leverage is in other non-bank financial entities, such as broker-dealers, hedge funds, finance companies, holding companies, and securitisation vehicles. Synthetic leverage is also unevenly distributed across the NBFI sector. While many hedge funds operate strategies with relatively low levels of leverage, certain hedge funds, typically pursuing macro and relative value strategies, exhibit very high levels of synthetic leverage through derivative positions. They often employ substantial leverage to amplify returns, which can lead to rapid deleveraging during market stress, causing significant price movements and affecting liquidity in the underlying assets.

Banks and broker-dealers acting as prime brokers play a critical role in providing leverage to hedge funds, through a variety of sources including margin loans, securities lending, repo financing and derivatives. Large hedge funds often diversify their leverage sources across several prime brokers, creating leverage that is difficult to track and manage in aggregate. The failure of a major hedge fund could lead to substantial losses for prime brokers, which in turn could affect other financial institutions and markets.

NBFI leverage can create financial stability risks particularly in financial markets that are at the core of the financial system, and whose functioning is essential for the real economy. Amplification factors, such as interconnectedness, concentration and liquidity imbalances, are particularly pronounced in NBFI. Examples include certain large and concentrated risk exposures, held either by a single non-bank financial entity or collectively by a cohort of entities with highly similar investment strategies that lead them to act uniformly (i.e. crowdedness). When such exposures are leveraged, the impact of adverse market shocks is amplified and can generate significant losses. Financial stability risks may materialise if the entities holding such exposures are forced to deleverage in a market that cannot absorb the sales in an orderly manner. Disruption in that market may also spillover to (other) core markets (the position liquidation channel). Financial stability risks may materialise also if the concentrated leveraged exposures are held by entities that are large enough to threaten systemically important counterparties (the counterparty channel).

Concentrated leveraged risk exposures can often build up unexpectedly (i.e. when leverage is 'hidden'). For example, when a non-bank financial entity borrows from several prime brokers, no single prime broker would necessarily know the full extent of the concentrated positions built up by the entity. More generally, identifying and measuring concentration risk and crowdedness can be challenging. For example, while market participants may be able to assess their own concentration risk, by comparing the size of their risk exposures to their total capital or to the aggregate size of the relevant market segments, they may not provide their counterparties with sufficient information to do so. Lack of information disclosure that is necessary to correctly price risks, particularly related to concentration of exposures and crowded trades, may hinder the management of liquidity and counterparty credit risks and the efficient provision and pricing of leverage.

Liquidity imbalances can also act as amplification factors. Spikes in the demand for liquidity, for example due to margin calls or open-ended fund redemptions, can amplify asset price movements, which in turn can amplify the need for leveraged entities to raise liquidity by selling assets. In extreme stress conditions, this adverse feedback loop can result in fire sale dynamics.

NBFI leverage may also be difficult for authorities to identify or measure. The NBFI leverage report found significant gaps in regulatory disclosures, particularly concerning critical data and metrics that authorities would need to monitor vulnerabilities in an effective and timely manner. For instance, while several jurisdictions collect data on hedge funds and certain other leveraged funds, in some cases vulnerabilities related to synthetic leverage cannot be fully monitored due to low consistency in data reporting. Data on liquidity preparedness – e.g. the ability of investors to respond to spikes in margin calls on their leveraged positions – is also limited, especially for hedge funds and other leveraged investment funds and pension funds. Where available, entity-level reporting (e.g. regulatory reports) 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). While most jurisdictions have derivatives reporting requirements in place, reporting requirements for SFTs are less common.[7]

In addition, for some types of entities or exposures, regulatory disclosures may not be sufficiently granular or detailed for authorities to identify leveraged concentrated exposures within their markets. Measuring concentration risk can also be difficult if the aggregate size (or liquidity) of the relevant market is unobservable or difficult to define. While authorities (and market participants) can typically access information on the total trading volume or outstanding debt or equity of a specific issuer, or even the deliverable supply of a commodity, quantifying the aggregate size and liquidity of the relevant market segment in interest rates or foreign exchange is more challenging. Whereas information on open interest and trading volumes for fixed-income exchange-traded derivatives and outstanding government debt are generally available, aggregate data on over-the-counter (OTC) derivatives and securities financing transactions are more limited.

Other data challenges can be related to entities that are located outside the jurisdiction or not subject to entity-level regulatory reporting requirements, including those that are outside the regulatory perimeter. For example, family offices and other private investment entities also take

[7] In the EU, Regulation 2015/2365 of the European Parliament and of the European Council on transparency of SFTs and of reuse prescribes such reporting requirements.

on leverage, but absence of regulatory reporting requirements makes it challenging to assess the size and concentration of their exposures.

Finally, the lack of sufficiently consistent global standards for the reporting of leverage, e.g. on derivatives and margins, hinders the ability to comprehensively assess and monitor NBFI leverage and associated financial stability risks at the global level.

2.3. Role of NBFI leverage during recent episodes of stress

NBFI leverage played a significant role in some recent episodes of stress. In March 2020, during the 'dash for cash', the high amount of NBFI leverage contributed to stress in the US Treasury markets. High leverage may have been facilitated by the lack of supervisory guidance on maximum leverage for investment funds (including hedge funds), and the ability of such funds to fund transactions with near-zero haircuts in bilateral government bond repo markets. In addition, leverage providers may have lacked sufficient visibility into client strategies that relied on transacting in US Treasuries, and their overall positioning, hinting at possible gaps in their governance of risk management and know-your-client practices. The Treasury cash-futures basis trade also motivated liquidations of Treasury positions. As Treasury market volatility rose, margins on Treasury futures positions increased, as did borrowing rates in Treasury repo markets. These rising costs motivated basis traders to partially unwind their positions, adding to the significant volumes of sales from other market participants and potentially worsening market instability. Since the episode of stress in March 2020, several policy measures have been implemented to address such adverse market dynamics, such as mandatory central clearing for US Treasuries and Treasury repo, which may impose minimum margin requirements on a larger segment of the market.

In March 2021, the default of Archegos, an unregistered family office, was a stress event marked by significant leverage and mispriced counterparty credit risk via Total Return Swaps (TRS). This event also highlighted the potential need for improved supervisory guidance to better address risk capture, including concentration, liquidation and correlation in risk metrics. While key principals from Archegos have been convicted of fraud and manipulation, including lying to their counterparties, those counterparties varied in terms of the robustness of their risk management practices and the degree to which they proactively assessed Archegos' exposures. Therefore, certain counterparties did not receive full information on Archegos' concentrated exposures. This led to insufficient initial margin, including insufficient concentration add-ons and high aggregate leverage limits. Moreover, family offices, like Archegos, largely fall outside the regulatory perimeter, and their synthetic leverage positions were therefore excluded from the relevant entity-level reporting requirements in several jurisdictions. Since then, multiple authorities across many jurisdictions have collaborated on a supervisory response that identified the need to address weak risk management practices, including international guidelines for counterparty credit risk management. In addition, US authorities implemented supervisory guidance and completed the implementation of their security-based swap regime in October 2021.

The commodities market stress in 2022 was characterised by position liquidation in response to increasing margins and counterparty credit risk, as clearing members of CCPs faced rising

default risk and, in some cases, actual default of clients.[8] Non-bank financial entities involved in this stress event included commodity producers, with cascading effects on CCPs, brokers, commodity investment funds, banks and physical commodity trading firms. Commodity derivatives markets including energy, metals, and grains were affected. Identified policy gaps included a lack of disclosure requirements between counterparties which limited clearing members' ability to identify large positions and manage concentrations, and exemptions for physically settled OTC derivatives from bilateral margining requirements and certain transaction reporting requirements. Trading venues in some jurisdictions also lacked transparency on OTC exposures, which inhibited the ability of the venues to identify and manage larger concentrated positions and to ensure market integrity. Since then, the London Metal Exchange (LME) has imposed weekly reporting of OTC exposures on members and introduced daily price increase limits.

During the LDI crisis in September 2022, NBFI leverage amplified stress in the UK Gilt market, leading to position liquidation in response to margin stress, risk limit breaches and enhanced counterparty risks for banks. 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 market functioning with knock-on impacts to the real economy. For example, UK mortgage lenders withdrew mortgage products due to challenges in pricing them using sterling swaps and Gilt prices. Ultimately, liquidity supply and market functioning were restored via targeted central bank interventions. Several policy gaps were identified: 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; and lack of appropriate concentration and wrong-way risk margin add-ons or entity-based constraints. Since then, authorities in Ireland and Luxembourg developed and introduced a yield buffer requirement for GBP-denominated LDI funds domiciled in their jurisdictions, as provided for in EU law. Separately, UK authorities pursued similar measures for UK-domiciled defined benefit pension schemes that invest in LDI funds.

2.4. Interlinkages with systemically important financial institutions

Leveraged non-bank financial entities are interlinked to systemically important financial institutions, including banks, who provide them with leverage, and CCPs, through direct access. Both the collapse of Archegos and the commodities market stresses illustrate how the default or distress of a non-bank entity can propagate stress to its counterparties, including banks, broker-dealers and, in the case of nickel markets, to a CCP, primarily through the counterparty default channel. Inadequate counterparty credit risk management practices and margining among certain leverage providers amplified the size of potential and actual losses. Leverage providers failed to adequately manage the concentrated risk exposures, partly due to the lack of information regarding both the overall scale of concentrated positions and liquidity preparedness of their counterparties. CCPs may also lack sufficient visibility of aggregate exposures of clients, especially those clearing through more than one clearing member; and of non-centrally cleared

[8] See FSB (2023), *The financial stability aspects of commodity markets*, March.

and related exposures of their clearing members or their members' clients, which can similarly affect their ability to manage concentration risk.

As discussed in the 2024 BCBS Guidelines, improvements in onboarding and ongoing monitoring of client exposures, as well as effective collateral management processes, can help resolve weaknesses in counterparty credit risk management. Effective risk management requires leverage providers to have access to relevant information to assess and effectively price risks, including considering issues such as crowdedness, liquidation, and concentration risks of leveraged exposures. Private disclosure by leveraged non-bank financial entities of relevant positions, strategies, and liquidity risk management capabilities to their leverage providers would help reveal concentrated and large exposures (such as those that featured in the Archegos case). This could support more efficient pricing of the provided funding, potentially leading to a reduction of NBFI leverage, particularly where concentration and crowdedness are more pronounced.

2.5. Incongruences in regulatory treatment of NBFI leverage

Several authorities have recently reinforced or introduced new regulatory measures on central clearing, margining and capital requirements for OTC derivatives, which apply to a broad range of entities. These may have already reduced certain financial stability risks related to NBFI leverage. However, incongruences remain in the regulatory treatment of certain financial instruments or between different non-bank financial entities undertaking similar leveraged activities. Such incongruences may incentivise market participants to favour certain instruments and strategies over others, which in turn may result in regulatory arbitrage.[9]

Where such incentives arise, market participants may shift risk-taking to the more advantageous product, which can lead to the build-up of NBFI leverage. For example, incongruences in respect of margining could have an impact on the provision of leverage to non-bank financial entities and their leverage-taking behaviour, such as shifting leveraged activities between centrally cleared and non-centrally cleared markets, or between products with similar economic profiles.

Incongruences have been noted in margin treatment. 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 both the lower hedging costs as well as the much lower haircuts on bilateral UK Gilt repos compared to the initial margin demanded by CCPs on the centrally cleared swaps. This allowed funds to increase leverage.

Differing regulatory treatment under the capital framework (leverage ratio) for banks may make synthetic prime brokerage using TRS less capital-intensive than traditional prime brokerage arrangements that lend cash collateralised by securities, to the extent they can offset the positions. This may incentivise banks to supply leverage through synthetic prime brokerage, instead of margin lending or repo lending.

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

2.6. Challenges in cross-border cooperation and coordination

A significant amount of NBFI leverage is provided and taken on a cross-border basis by globally active firms. This means that effective international cooperation and coordination would be beneficial to support authorities' efforts to mitigate financial stability risks arising from NBFI leverage. This could include more closely integrated system-wide 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.

Recent examples of successful cross-border cooperation and coordination include the conduct of joint supervisory reviews by bank prudential authorities following stress events involving Archegos and the LME nickel market stress, 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 its aftermath regarding consistent resilience standards for GBP-denominated LDI funds in Ireland and Luxembourg, and pension scheme investors in LDI funds in the UK. In each case, close cooperation allowed a more efficient and effective regulatory response, including the mitigation of regulatory arbitrage and cross-border spillovers through enhanced alignment across jurisdictions.

However, international cooperation must consider 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 MoUs, facilitate data and information sharing in a timely manner, and should be relied upon as much as possible, 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

Authorities currently employ a broad range of policy measures to identify and address vulnerabilities related to NBFI leverage and associated financial stability risks. These can generally be categorised as follows: public and private disclosure, activity-based measures, entity-based measures, and regulatory and supervisory guidance. While some of these measures have not been specifically designed to mitigate financial stability risks from NBFI leverage, they can be re-purposed by authorities to address these risks, subject to appropriate design and calibration.

3.1. Public disclosure and private disclosure

Disclosure does not directly limit NBFI leverage, but it can help enhance transparency and market discipline by providing information that may help authorities and market participants to better monitor, understand and manage vulnerabilities and risks related to NBFI leverage. As such, it complements other measures that directly restrict leverage or constrain concentration risks and supports the implementation of regulatory guidance on liquidity and counterparty credit risk management.

Public disclosure can include information disseminated either by authorities, based on aggregating data and information received from regulatory reporting, or directly by private entities to the public. Public disclosure can improve market participants' understanding of market dynamics and support their risk management practices. For instance, publicly available aggregate information can help market participants to identify exposure concentrations and crowdedness and to better understand leverage and liquidity conditions in the markets in which they operate. These insights can improve the ability of market participants to estimate losses and liquidation costs under stressed conditions, and therefore adjust leveraged exposures and calibrate liquidity buffers to absorb shocks, for example due to spikes in margin calls related to increased market volatility.

Information disseminated via public disclosure may include data on market liquidity conditions and aggregate positioning, which can support monitoring of concentrations, crowdedness and less liquid conditions developing in certain markets. Metrics could be disclosed for a wide range of markets, covering OTC and exchange-traded derivatives, SFTs and securities.[10] Authorities may also be able to combine and present aggregate data across different products to enable monitoring of trends in large, structural, crowded leveraged strategies that have been identified through their monitoring frameworks. Authorities also use other forms of public communications, such as regular market monitoring report, financial stability reports and system-wide stress testing results, to disseminate information on NBFI leverage risks in market-based finance.[11]

Dissemination of non-anonymous and timely information can be even more useful for risk management purposes; however, it may have an adverse effect on *bona fide* risk-taking and hedging activity, as market participants may limit their activity to avoid crossing public disclosure thresholds. It could also contribute to market volatility if market participants proactively adjust their positions in response to seeing disclosures by others. In other cases, dissemination may result in an increase in crowded trades if market participants copy the trading strategies of well-known or well-performing funds. Non-anonymous disclosure therefore requires careful consideration and balancing of the benefits of transparency for market discipline with the likely reduction in participation and overall market liquidity.

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10 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).

11 In the US, the Office of Financial Research publishes a Hedge Fund Monitor that aggregates data across public and private sources and presents these data in a public tool.

Market participants' use of public disclosure for risk assessment is voluntary and, for some entities, nascent in practice. Disclosure can therefore be more effective when accompanied by guidance on the use of such information for counterparty and liquidity risk management.

Private disclosure to counterparties can give leverage providers more robust, timely and detailed information about trading activities and risk exposures, allowing them to identify concentration risks and potentially crowded trading strategies, and support their counterparty credit risk management. Insights on the full scope and scale of their non-bank financial counterparties' 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. They 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 non-bank counterparties, e.g. against concentrated positions that are discreetly spread across multiple counterparties.

Private disclosure requirements can be implemented through either regulation or supervisory guidance and applied to either providers of leverage, leveraged entities, or both.

3.2. Activity-based measures

Activity-based measures, which mitigate counterparty credit risk (i.e. the risk of losses from the close-out of positions following the default of a counterparty), increase the cost to build and maintain certain leveraged investment and trading strategies in a way that is proportionate to their riskiness. As a result, they can contribute to restricting the amount of leverage used by firms or sectors when engaging in such strategies.

Examples of activity-based measures include margin and clearing requirements introduced in the aftermath of the GFC, e.g. minimum margining requirements for non-centrally cleared derivatives, central clearing requirements for certain derivative instruments and minimum haircuts for non-sovereign, non-centrally cleared SFTs.[12] Regulatory margin requirements for non-centrally cleared derivatives impose two-way margining and therefore help mitigate counterparty risk and constrain leverage for both counterparties. Minimum haircuts for non-centrally cleared SFTs typically affect the amount of securities that must be posted as collateral by the cash borrower, meaning that in collateral-specific, security-driven transactions they do not protect the security lender (i.e. the cash collateral recipient) or constrain the leverage of the security borrower (i.e. the cash collateral provider).[13] For non-centrally cleared SFTs, another type of activity-based measure could be represented by regulatory margin requirements where both counterparties would post margin, similar to the margin requirements for non-centrally

[12] BCBS-IOSCO (2020), *Margin requirements for non-centrally cleared derivatives*, April; and BCBS (2021), *CRE56 - Minimum haircut floors for securities financing transactions*, July.

[13] SFTs can sometimes be driven by market participants' desire to acquire specific securities (i.e. security-driven), in which case they may be willing to pledge cash in excess of the market value of the securities acquired (effectively, a negative haircut). In these cases, minimum (positive) haircuts may affect the interest rate offered in the transaction and even disincentivise the security provider from transacting.

cleared derivatives transactions.[14] Margin requirements for SFTs would help mitigate risk and constrain leverage for both counterparties (i.e. the cash borrower and the cash lender).

Another measure implemented more recently is the rule adopting certain requirements for central counterparties servicing the US Treasury market, which includes certain requirements regarding the separation of house and customer margin at such CCPs.[15] Margin regulations for CCPs and non-centrally cleared markets also include requirements for margin concentration add-ons (which apply on top of standard initial margin requirements). CCP requirements are contingent on the relative size of an entity's exposure with respect to its own portfolio, available collateral in the market and other members' positions. In this way, margin requirements can directly constrain concentrated positions.

Recent stress events suggest that there are pockets in non-centrally cleared markets where margins remain very low relative to the risks (see Section 2.3). Margins applied to non-bank financial entities may not be calibrated to capture tail risks arising from system-wide stress events, including the effects of wrong way risk, correlation and concentration. Furthermore, there may be gaps in existing minimum margining requirements, such as a lack of minimum margins for SFTs or margin exemptions, which could lead to under-pricing of risks.

Activity-based measures can be implemented via legal frameworks that specify market-wide margin rules and central clearing mandates, or via the application of minimum margin and clearing requirements on regulated dealer banks, using regulatory or supervisory frameworks. In the former case, subject to the inclusion of thresholds or exemptions, activity-based measures would apply to all entities regardless of the entity type, including NBFI entities that may be outside the regulatory perimeter. However, the application of varying exemptions for certain types of products and entities has led to uneven implementation of certain margin and clearing regulations.

Activity-based measures may also increase the cost of hedging and have adverse effects on market liquidity, particularly when applied universally across market participants. Where measures incorporate netting and/or cross-margining arrangements, these adverse effects may be reduced, but at the same time the measures' effect on leverage could be diluted. Certain margin-related measures could also exacerbate liquidity risk by creating incentives for market participants to de-lever during a period of stress when liquidity is scarce (procyclicality). Effective calibration is therefore important to limit such unintended consequences. For example, rules-based margins and anti-procyclicality measures can help to reduce margin reactivity and incentives to de-lever in stress.

3.3. Entity-based measures

Entity-based measures, such as leverage or concentration limits, restrict the amount of financial and synthetic leverage a non-bank financial entity can take. They can be used in a proportionate way to target specific types of leveraged non-bank financial entities, or cohorts of entities,

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14 ESRB (2020), *Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions*, January; ESRB (2024) *A system-wide approach to macroprudential policy*, November.

15 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.

operating in core markets, with the aim to restrict leverage across all their activities. Entity-based measures can therefore reduce the likelihood and magnitude of procyclical deleveraging, protecting investors and/or counterparties. Depending on the risk profile of the entity and the objectives of the measure, they can be direct or indirect, risk-based or non-risk-based. Entity-level leverage measures are often applied to non-bank financial entities that pursue a specific strategy as their predominant activity. They are less common in cases of entities with complex strategies, such as hedge funds and other leveraged funds. Entity-based measures may be structural or applied conditionally, e.g. after financial stability risks have been identified.

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 entity. They 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 to all investment trusts, public or private, domiciled in Japan, to alternative investment funds in India and certain investment funds in the US.[16] Indirect constraints on leverage include measures such as the yield buffer requirements for GBP-denominated LDI funds, which were introduced in some European jurisdictions and calibrated to ensure that LDI funds maintain resilience to an extreme but plausible scenario. 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.[17] Other indirect measures include Value-at-Risk (VaR) constraints on UCITS funds in the UK and the EU, which were implemented to protect investors.

For complex non-bank financial entities that operate multiple strategies, the calibration of entity limits becomes more challenging, as those entities can re-allocate leverage across activities with different risk profiles.

The implementation of entity-based measures typically occurs via legal frameworks that define and regulate the types of entities in scope. Entity-based measures may also be enforced by supervisory action targeting individual entities or specific groups of entities. The use of entity-based measures varies across jurisdictions, subject to prevailing market structures and existing regulatory frameworks. For certain jurisdictions, existing rules already contain limits for specific types of entities and provisions that allow authorities to set leverage limits when certain conditions are met. In other jurisdictions, entity-based limits may not be feasible at present due to statutory or other limitations. In addition, entities outside the regulatory perimeter or located in another jurisdiction will not be in scope of such measures. In the latter case, cross border collaboration or reciprocity may be required to fully address risks.

Calibration of entity-based measures needs to balance risk mitigation with avoiding restrictions on beneficial aspects of NBFI leverage. For example, *bona fide* hedging activities, which may

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16 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.

17 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 on to maintain a positive NAV following a specified interest rate shock. Such limits were introduced in Ireland and Luxembourg in November 2022.

be difficult to identify, should ideally not be restricted. Entity-based measures could also generate potential adverse effects in markets where leveraged non-bank financial entities are significant liquidity providers.

3.4. Supervisory guidance

Supervisory guidance sets out authorities' expectations for the implementation of regulations at firm level. It provides examples of practices that enhance firms' resilience and risk management, which may contribute to constraining the amount of leverage that entities may provide or incur when pursuing specific risk-taking activities.

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 it is rooted in existing regulation it cannot introduce new policy measures, rather it can only clarify the application of existing measures. Depending upon existing regulatory frameworks, guidance can be directed to both regulated non-bank financial entities using leverage (such as investment funds or insurers) and to the providers of leverage, such as banks, other prime brokers or other non-bank entities.

Some jurisdictions have issued supervisory guidance related to the use of NBFI leverage that aims to enhance the measurement and management of liquidity risk associated with margin calls on leveraged positions or strategies. 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.[18] The scope of supervisory guidance is limited to non-bank financial entities within the regulatory perimeter, and where supervisory authorities have the required statutory authority. Supervisory guidance applied to leverage providers aims to enhance counterparty credit risk management standards, thus mitigating the potential for financial stability impacts through the counterparty default channel. 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. This is intended to inform banks' margining practices and their risk appetite towards leveraged entities or crowded and concentrated positions. Guidance may also be issued in response to a specific market event or stress, targeted to address identified deficiencies in risk management practices. 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.

Guidance is typically targeted at specific types of entities rather than activities, with notable differences in its specification and supervisory approaches among jurisdictions. This diversity in approaches could lead to activities migrating to other jurisdictions or sectors, to the extent that the other jurisdictions or sectors do not have comparable measures in place. This suggests that

[18] 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.

authorities should consider the need for increased alignment and harmonisation of existing guidance across relevant jurisdictions and sectors.

3.5. Complementarity of policy measures

Given the complex nature of financial stability risks from NBFI leverage and the differences in how the various policy measures operate, in many cases a single policy measure in isolation will have limited effectiveness. Combinations of measures may therefore be more effective.

For example, while public and private disclosures do not directly restrict NBFI leverage, they provide market participants with important information about their 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, disclosures to authorities may inform their 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 aligning 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 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 be not 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 NBFI entities engaging in similar behaviour, and which might collectively have highly concentrated positions in core markets, they may not restrict crowdedness and concentrated leveraged exposures when these are held across a range of entity types or asset types. On the other hand, activity-based measures, such as margin requirements and central clearing mandates, may not constrain strategies that involve concentrated positions in a market or a market segment, unless counterparties and CCPs can identify the exposures 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 private disclosures aimed at improving transparency limit the potential for leverage to remain hidden due to concentration or crowdedness, and therefore also complement activity, entity and concentration 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, powers to issue supervisory guidance can complement the policy toolkit of authorities. But to the extent that the focus of supervisory guidance is often 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.

4. FSB recommendations

The FSB is consulting on policy recommendations to address NBFI leverage vulnerabilities and associated financial stability risks. Entities in scope are non-bank financial firms that use leverage, either financial or synthetic, 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. Market structures, legal frameworks, NBFI leverage vulnerabilities and associated financial stability risks vary across jurisdictions. Therefore, the policy measures outlined below may operate in different ways in different jurisdictions and may be effective for some, but not all, non-bank financial entities that use or provide leverage within a jurisdiction. In many cases, combinations of policy measures may be most effective.

The recommendations are directed to authorities and SSBs and focus on markets, entities, and activities where financial stability risks from NBFI leverage are more pronounced. The selection, design and calibration of the policy measures should give authorities confidence that underlying vulnerabilities and financial stability risks arising from NBFI leverage have been sufficiently addressed. To this end, the FSB and SSBs will undertake further work to support and assist authorities in applying the recommendations, including by developing guidance where appropriate, regarding the operationalisation of certain recommendations.

4.1. Risk identification and monitoring

Recommendation 1: Authorities should have a domestic framework to identify and monitor vulnerabilities related to NBFI leverage and associated financial stability risks in an effective, frequent and timely manner. The domestic framework should be proportionate to the financial stability risks that such vulnerabilities may pose, particularly in core financial markets. Authorities should regularly review their domestic framework and enhance it as appropriate, including the risk metrics utilised, and 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 vulnerabilities related to NBFI leverage and associated financial stability risks, particularly those in core financial markets, in a timely and effective manner. The framework should be composed of tools and processes for regular NBFI leverage monitoring and should be proportionate to the financial stability risks that such vulnerabilities may pose, including potential cross-border spillovers from and to other jurisdictions. To facilitate the monitoring of vulnerabilities, domestic frameworks should be supported by risk metrics ('toolkit metrics'), such as those described in Section 4.1.1 and detailed in Annex 1.

Authorities should review the domestic framework on a regular basis, and enhance it as appropriate, including to reflect developments in market structures, investor base composition 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 that originate from NBFI leverage in their domestic jurisdiction, as well as risks that may spillover 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 the IOSCO's Recommendations for a framework assessing leverage in Investment funds.[19]

4.1.1. Toolkit metrics

Leverage-related vulnerabilities are multifaceted and may differ across types of leveraged non-bank financial entities and activities. As a result, authorities should consider a suite of toolkit metrics to identify and monitor vulnerabilities related to NBFI leverage. The appropriate degree of complexity, level of specificity and granularity, as well as frequency and timeliness of calculation, of the toolkit metrics depend on a range of factors. Such factors include the type and prominence of NBFI leverage vulnerabilities in the domestic financial system, the complexity of the business models and investment strategies of leveraged non-bank financial entities, and the degree of sophistication of leveraged activities. Authorities should particularly consider those toolkit metrics that best capture the most relevant dimensions of NBFI leverage vulnerabilities, in a manner proportionate to the financial stability risks in their jurisdiction and to the spillovers to other jurisdictions. Such dimensions include:

- *Leverage metrics*, 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 non-bank financial entities, as well as risks related to liquidity demands stemming from the use of leverage.
- *Sensitivity to market risk*, including metrics that account for 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 on- and off-balance sheet leverage, both synthetic and financial leverage. When identifying and monitoring financial stability risks from NBFI leverage, authorities should also consider a sector or system-wide perspective. To facilitate the assessment of vulnerabilities and risks from concentration and crowdedness, this would include considering the combined positions of non-bank financial entities with similar business models or investment strategies.

4.1.2. Addressing data challenges

Recommendation 2: Authorities should review their domestic framework to assess data challenges, including on (i) authorities' usage 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

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

requirements. Authorities should seek to address data challenges and, where appropriate, collaborate through the FSB and SSBs to reduce those challenges that may hinder the effective cross-border monitoring of vulnerabilities, as set out in Recommendation 9.

The monitoring of vulnerabilities requires access to a wide range of data. Authorities should review their monitoring framework, considering the quality, frequency and timeliness of the data they use, as well as existing reporting requirements and their access to relevant data. To adequately identify and assess vulnerabilities from NBFI leverage and associated financial stability risks, authorities should identify and address, where appropriate and 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.

Authorities should review the scope, frequency and granularity of reporting items, as well as access rights for authorities in the same jurisdiction. When addressing these challenges, authorities should consider both the costs and benefits of enhanced monitoring of vulnerabilities and financial stability risks. For instance, before considering additional reporting requirements, authorities should assess the effectiveness of current reporting regimes, avoid reporting duplications and simplify reporting procedures. 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 entity-level data (e.g. supervisory reports on asset holdings) with more timely and granular information such as transaction- or position-level data (e.g. data from TRs on derivatives and SFTs) or any other relevant dataset, such as information collected by 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, either by (i) authorities, including disclosure based on regulatory reporting data, (ii) the relevant financial market infrastructure providers or (iii) directly by financial entities, balancing the costs and benefits of doing so. 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.

Public disclosures on market dynamics, such as aggregate positioning or transaction volumes, increase transparency for market participants and authorities. The effectiveness of public disclosures depends on the quality of the information provided to market participants. Disclosures that are aggregated at a very high level or reported 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 trader positions broken down by participant type or transaction registration volumes at derivatives 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 might also consider disclosing other types of NBFI 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 non-bank financial entities may help market participants to contextualise their own use or provision of leverage, and to identify the build-up of risks over a longer time horizon.

Any additional public disclosures should consider the different dimensions of the information being disclosed (e.g. granularity, timeliness, grouping across similar entities) and the entity responsible for compiling and disseminating the information (e.g. authorities or, in the case of direct disclosure, CCPs, trading venues, settlement systems, TRs or entities with leveraged positions). Authorities should also consider the burden of additional reporting requirements on market participants and ensure that this remains proportionate.

4.2. NBFI leverage in core financial markets

Recommendation 4: Authorities should take steps to address the financial stability risks from NBFI leverage that they identify in core financial markets. Activity-based and entity-based measures and measures aimed at addressing concentration that amplifies risks related to NBFI leverage, should be reviewed periodically and enhanced where appropriate, including to address risks from a system wide perspective. The measures should be selected and calibrated to be effective and proportionate to the identified financial stability risks. 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.

NBFI leverage can be significant in core financial markets, the proper functioning of which is essential for the real economy. Dysfunction in these markets, including government bond cash and repo markets, or real estate investment markets, can threaten financial stability and have large adverse effects on the real economy. NBFI leverage can create financial stability risks in these markets mainly through the position liquidation channel. Procyclical deleveraging during stress by leveraged non-bank financial entities, or a cohort of entities with similar or crowded strategies, can lead to spillover effects and adverse feedback loops that may cause market disruption. Authorities should assess these vulnerabilities in their jurisdiction and have appropriate policy measures in place to mitigate associated financial stability risks.

Policy measures should be selected to best mitigate the specific financial stability risks from NBFI leverage in core financial markets (see Section 4.4). Activity-based measures can be used to target highly leveraged strategies employed by a range of non-bank financial entities, which may be subject to different regulatory frameworks or even be outside of the regulatory perimeter (see Section 3.2). Entity-based measures can be used to constrain the amount of leverage and thereby enhance the resilience of large non-bank financial entities, or cohorts of such entities (see Section 3.3). Concentration measures, whether applied at entity or activity level, can target the amplification effects of concentrated leveraged exposures in certain markets or products. Authorities may also consider using supervisory guidance, where appropriate (see Section 3.4). Where individual policy measures do not adequately mitigate financial stability risks from NBFI leverage in core financial markets, authorities should consider combinations of policy measures (see Section 3.5).

More generally, authorities should develop a comprehensive and coherent approach to addressing financial stability risks from NBFI leverage in core financial markets, including by considering new and additional policy measures, as appropriate. For example, where existing legal and regulatory frameworks do not provide the necessary policy tools to address identified financial stability risks, authorities should consider adjusting or widening the scope of such frameworks, where appropriate. In some jurisdictions, this could require giving authorities new or enhanced powers.

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 non-bank financial entities 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 evaluate a wide range of measures, including both activity and entity-based measures, as well as concentration related measures. Authorities' choice of measures should be based on the nature and drivers of identified risks, taking into account their expected effectiveness and any potential costs or unintended consequences, as well as measures taken in other jurisdictions to address similar risks. Activity-based measures include (i) minimum haircuts in SFTs, including government bond repos, (ii) enhanced margining requirements between non-bank financial entities and their derivatives counterparties, and (iii) central clearing mandates in SFT and derivatives markets. Entity-based measures include (i) direct limits on leverage, and (ii) indirect leverage constraints linked to risks that non-bank financial entities are exposed to. Concentration measures include (i) concentration add-ons for margins and haircuts in connection with exposures of non-bank financial entities in derivatives and SFT markets, (ii) concentration and large exposure limits, and (iii) large position reporting requirements.

Where the NBFI leverage can create financial stability risks in core financial markets, authorities should consider the following policy measures. While authorities need to be able to tailor policy measures to the specific circumstances in their jurisdictions, they should aim to minimise cross-border arbitrage opportunities.

4.2.1. Activity- and entity-based measures

Minimum haircuts in securities financing transactions

Authorities should consider implementing minimum haircuts in SFTs, including government bond repos, when used by non-bank financial entities, and fully implement the FSB regulatory framework for haircuts on non-centrally cleared SFTs (which excludes government bond repos). Minimum haircuts act as a floor and are expected to be effective where haircuts imposed by dealers are not adequate to reflect the risks. Minimum haircuts should not only reflect the risks of the underlying assets used as collateral, but also consider market dynamics and overall liquidity. Minimum haircuts should be calibrated to mitigate financial stability risks, but also to balance other effects, such as a reduction in market activity or liquidity that could increase transaction, funding or hedging costs.

While haircut floors would help mitigate financial stability risks, market participants should still dynamically set haircuts according to their internal risk management. Therefore, authorities may consider providing additional guidance requiring bilateral counterparties of non-bank financial entities to dynamically adjust haircut levels (above the floor) to reflect changes in the risk environment and market conditions, including to consider system-wide effects of procyclical NBFI deleveraging.

Minimum haircuts in SFTs should be prioritised where authorities have identified specific financial stability risks from NBFI leverage in SFT markets, e.g. where investment strategies have become concentrated and crowded, where risk is mispriced, or to address incongruences in the regulatory treatment of risks (see Recommendation 9). This may be the case in certain government bond repo markets, where duration risk may be very high and competitive pressures among providers of leverage to non-bank financial entities may contribute to compression of haircuts to incongruent (often zero) levels.

Minimum haircut requirements can apply to all SFTs used by non-bank financial entities. Depending on the specificities of the market structure in their jurisdiction, authorities should consider whether to implement minimum haircuts in SFTs 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. Where non-bank dealer entities are more prominent, market-wide regulations could be more effective.

Enhanced margining requirements in derivatives markets

Authorities, in cooperation with SSBs, should review margining requirements for non-bank financial entities engaging in leveraged strategies in centrally cleared and non-centrally cleared derivatives markets. This should include considering whether adjustments to the existing global framework could help to further mitigate financial stability risks from NBFI leverage.

While margining requirements are primarily targeted at reducing counterparty credit risk, they can help address broader financial stability risks created by NBFI leverage. Authorities, in cooperation with SSBs, may consider providing market participants with guidance on when and how entities should increase margin levels (e.g. via add-ons) to reflect the impacts of tail risks from procyclical NBFI deleveraging and contagion to other markets where this is not already appropriately addressed in existing guidance. These risks may not be fully captured in baseline margin requirements and can be significant when high volatility and amplification factors such as concentration and interconnectedness are present. Authorities, in cooperation with SSBs should also review, as appropriate, existing exemptions from standard margining requirements for certain product (e.g. wholesale energy derivatives and equity options) or entity types.

When considering potential amendments to margining rules in derivatives markets, authorities, in cooperation with SSBs, should consider the potential for unintended adverse consequences, for example on hedging activity.

Central clearing mandates in SFT and derivatives markets

Authorities should consider mandating central clearing in SFT and derivatives markets where not yet in place. CCPs set initial margin requirements that must comply with regulatory minimum coverage requirements for all transactions with clearing members, while enhancing transparency and providing centralised counterparty default management processes. Initial margin required by a CCP could be more effective in constraining leverage where there are requirements on clearing members to pass the initial margin through to clients, including leveraged non-bank financial entities. When considering expansion of mandatory central clearing to SFT and derivatives markets, authorities should consider to what extent models for client access and margining adopted by the CCPs, including scope of netting and cross-product margining arrangements, support the mitigation of risks from NBFI leverage. For example, authorities may need to consider requirements for the ultimate leverage recipient to pay the required margin from its own resources.

Because CCP initial margin models can be more reactive to rises in market volatility than non-centrally cleared initial margin arrangements, authorities may wish to consider complementary policies for mitigating liquidity stress. These may include supervisory guidance for strengthening liquidity resilience of non-bank financial entities to complement measures to mitigate the

procyclicality of CCP initial margin models in line with existing international guidance, where appropriate.[20]

Authorities may choose to expand 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 and remove a disincentive to central clearing. Authorities should review the effectiveness of existing thresholds for being in scope of minimum margining requirements for non-centrally cleared derivatives and enhance them, as appropriate.

Direct and indirect limits on leverage

Authorities should consider entity-based leverage limits to address financial stability risks from the build-up of leverage in individual non-bank financial entities, or cohorts of such entities, 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 non-bank financial entities and reduce externalities, e.g. from counterparty credit risk and procyclical deleveraging, to other entities or the broader financial system. 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.

Authorities should consider direct leverage limits, e.g. expressed as a balance sheet ratio, distinguishing between non-bank financial entity types and accounting for different investment strategies. The choice and design of direct leverage limits should consider netting and hedging, off-balance sheet exposures, as well as ways to capture the use of financial and synthetic leverage via derivatives.

As an alternative or complement to direct limits, authorities should consider indirect leverage constraints linked to risks that non-bank financial entities are exposed to. Such indirect, risk-based constraints could be informed by risk metrics (see Recommendation 1) and aimed at ensuring that entities remain 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 NBFI 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 adequate risk tolerance levels, based on relevant risk metrics and scenario analysis, and also consider any unintended consequences that such constraints may have on other activities of market participants.

Authorities should consider several factors when defining entities in scope of leverage limits. For instance, existing regulatory definitions of entity types could be used to define the scope of policy measures. If risks to financial stability are related to leveraged investments in a specific type of asset (e.g. real estate), the scope could be defined to include entities with predominant exposures to that specific type of asset. Entities in scope could also be defined in terms of their

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

activities (e.g. liability driven investment, loan origination) to tailor entity-based measures to risks associated with specific activities.

Calibration of the measures could be informed by the stress testing of entities, to design entity-based limits that are appropriate to the desired level of resilience. As the nature and magnitude of financial stability risks from NBFI leverage evolve over time, authorities should exercise supervisory powers, where available, to impose new or additional measures or adjust existing measures or their scope, as appropriate.

To mitigate procyclicality, authorities should consider allowing 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. Authorities should always clearly explain and communicate their actions to market participants to avoid any undesirable market reaction.

4.2.2. 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 markets, where clearing members are subject to stringent margining requirements by CCPs, including to manage concentration risk, and non-centrally cleared derivatives markets, where 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 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.[21] 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, these requirements are typically calibrated to mitigate counterparty credit risk and therefore may not fully capture the financial stability risks of procyclical deleveraging. Accordingly, authorities, in cooperation with SSBs, should review requirements for margin add-ons and haircuts between non-bank financial entities and their derivatives counterparties in centrally cleared and non-centrally cleared derivative and SFT markets, and enhance them where appropriate, to ensure adequate coverage of concentration risks in certain assets or segments of core financial markets.

Concentration and large exposure limits

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

[21] 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.

effectively constrain concentration risks. Authorities should weigh the costs and benefits of introducing position limits for specific asset classes or markets, such as derivatives or SFTs. In doing so, authorities would need to define the relevant market or market segments to which the limits would apply (see Section 2.2), as well as calibrate the limits, potentially according to the results of system-wide stress tests or liquidation cost analyses.

Large position reporting requirements

Where enhanced margin requirements and position limits are insufficient or unsuitable, authorities should consider complementing (or substituting) them with regulatory reporting on large positions in specific asset classes or markets. Large position reporting has typically been used for other objectives; for instance disclosure of large equity positions is intended to increase transparency into controlling positions. However, measures of this kind can also be used to increase transparency into the build-up of concentrated leveraged exposures. Authorities may wish to calibrate the thresholds for such reporting based on the results of system-wide stress tests or liquidation cost analyses. Restricting reporting to regulators only would avoid any adverse effect associated with public disclosure (see Recommendation 3). Authorities may consider it necessary to impose reporting requirements (e.g. on holdings of domestic government bonds) on all relevant market participants, irrespective of their domicile, to ensure sufficiently comprehensive coverage and thus accurate identification and calculation of concentrated and crowded positions, as well as to invest significant resources in regularly monitoring the data received.

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. In such cases, policy measures should be applied conditionally, i.e. targeted in terms of scope (entities, activities) and duration, and should consider, for example, a transition period to reduce the risk that the sudden imposition of the policy measure triggers procyclical deleveraging. Given these challenges, authorities may prefer to provide supplemental disclosure 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

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 represents an important element of a comprehensive policy response to financial stability risks stemming from NBFI leverage. Authorities, in cooperation with SSBs, should monitor, including from a systemic perspective, ongoing and future developments in the way NBFI leverage is provided to ensure that the regulatory framework remains appropriate for the consistent treatment of risks.

Linkages between leverage providers and leveraged non-bank financial entities represent a potentially significant amplification channel for financial stability risks related to NBFI leverage. As such, authorities should monitor them on an ongoing basis. Furthermore, some of these

linkages may involve non-bank financial entities that are outside of the regulatory perimeter, whose 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 fully supports the BCBS's call for strong counterparty credit risk management practices and for banks' risk mitigation strategies to incorporate the depth and breadth of counterparty disclosure.

4.3.2. Private disclosure

Recommendation 7: Authorities, in cooperation with SSBs, should review the adequacy of existing private disclosure practices between leveraged non-bank financial entities and leverage providers, including the level of granularity, frequency, and timeliness of such practices. Where appropriate, they should consider developing mechanisms and/or minimum standards to enhance the effectiveness of these disclosure practices.

Authorities should review existing private disclosure practices between leverage providers and their non-bank financial 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 SSBs, should consider providing guidance on the type of information to be provided by working, where possible, with industry stakeholders to identify potential solutions, including technological innovations, that could be voluntarily implemented between leveraged entities and leverage providers.

The nature of information and data that leverage providers receive from their non-bank financial counterparties is heterogeneous, non-standardised, and may vary widely in both quality and quantity. There could be benefits from a minimum principles-based set of standard disclosures to ensure visibility on aggregate leveraged positions. These standards could apply to leverage users to support the provision of sufficient quality information to their leverage providers, or to the harmonisation of the data exchanged, which would facilitate comparisons and aggregation across clients.

Authorities should consider applying the following principles:

- Specific types of information and data disclosed should take account of the strategies, products and markets in which the client is active, to ensure that the information provided is relevant and effective for the purpose of the leverage provider's risk management.
- Clients 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 client'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 toolkit metrics as set out in Recommendation 1 and in the Annex.

- Private disclosures should grant leverage providers the necessary transparency to effectively manage risks, including concentration risks, while allowing for proprietary client information to remain confidential. At a minimum, clients should provide information on the nature, scale and contours of their aggregate exposures and leverage in each major asset class, market or strategy, including through the provision of internal risk assessments (e.g. stress test results) and information about their risk management framework that covers such aspects.

- The information disclosed to each leverage provider should be limited to that which is relevant to the current and prospective risk exposure that the specific leverage provider has to the client, considering concentration and expected correlations amongst exposure types.

- The granularity of disclosures should be applied proportionately, using a risk-based approach that incorporates the nature, scale and complexity of the risks that a given client poses to its leverage provider. Leverage providers may also request specific types of information and data beyond the minimum standard disclosures, taking account of the strategies, products and markets in which the client is active.

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

As noted above, NBFI leverage vulnerabilities and associated financial stability risks vary across jurisdictions. Therefore, the policy measures in this report may operate in different ways in different jurisdictions and may be effective for some, but not all, non-bank financial entities that use or provide leverage within a jurisdiction. The following principles can guide authorities when selecting measures to limit leverage-related risks in NBFI.

Selection

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

- Authorities should combine policy measures that are complementary to effectively contain the build-up of leverage where it can pose financial stability risks and to mitigate the impacts of such risks.

- Authorities should take into account policy measures taken in other jurisdictions to address similar risks, to prevent or mitigate potential cross-border spillovers and cross-border regulatory arbitrage.

- Authorities should evaluate new policy measures that can complement existing measures to achieve a comprehensive and coherent approach to addressing financial stability risks from NBFI leverage.

Design and calibration

- Authorities should clearly define activities and entities in scope of selected policy measures, taking into account their respective risk profiles. Policy measures should be applied proportionately, according to the potential impact of various entities and activities in scope on the broader financial system. This also involves assessing the specific characteristics, activities and risk exposures of different types of non-bank financial entities.

- Authorities should consider policy measures that align the incentives of non-bank financial entities with financial stability objectives. This involves designing policies that discourage excessive risk-taking and promote sound risk management practices.

- Policy measures should be sufficiently flexible so that they can remain effective if the underlying risk landscape changes in a structural way, e.g. they can be re-designed or re-calibrated to reflect new risks or financial innovation.

- Policy measures should be calibrated to mitigate financial stability risks from NBFI leverage. In cases where the 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 on financial stability risks related to NBFI leverage.

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

4.5. Addressing incongruences in regulatory treatment of NBFI leverage

Recommendation 8: Authorities should adopt the principle of “same risk, same regulatory treatment” and identify incongruences in the regulatory treatment of NBFI leverage resulting from similar exposures, financial instruments or structures that may distort incentives and result in regulatory arbitrage. Where incongruences are identified, authorities, in cooperation with SSBs, 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, in cooperation with SSBs, should regularly review the regulatory frameworks to identify incongruences in the regulatory treatment of NBFI leverage that may be distorting incentives amongst otherwise similar exposures, financial instruments or structures, and that might result in regulatory arbitrage and increased use of NBFI leverage. Where incongruences

are identified, authorities, in cooperation with SSBs, should investigate the drivers and underlying causes and consider conducting cost-benefit analyses to help inform their response.

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

From a systemic risk perspective, authorities, in cooperation with SSBs, should carefully monitor developments regarding how prime brokers provide leverage to non-bank financial entities and evaluate how the treatment of certain financial instruments within the capital framework affects the provision of leverage to the NBFI sector, including whether to align such treatment with other types of instruments and transactions that are used to provide leverage.

Congruent treatment should not imply identical treatment. When assessing congruence, authorities should have regard to the specific characteristics of different entities, whether the entity is a bank or a non-bank entity, or whether the non-bank entity is already subject to regulatory requirements that may have direct or indirect impact on leverage (such as mutual funds or insurance companies), product types (SFTs and derivatives), and counterparty arrangements (centrally cleared and non-centrally cleared transactions). While entailing exposure to similar economic risks and benefits, corporate lending by banks and certain non-bank financial institutions, such as private credit funds, could be subject to distinct regulatory treatment based on the different risks they can pose to the broader financial system. Similarly, initial margin calibration for centrally cleared derivatives typically utilises a shorter margin period of risk but a higher confidence interval than similar non-centrally cleared transactions, to account for the variation in their liquidity and counterparty risks.

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 their authorities), so that domestic remediation efforts do not create new disparities that could transfer risk across borders.

4.6. Cross-border cooperation and coordination

Recommendation 9: When addressing 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. To enhance system wide risk monitoring across jurisdictions, authorities should proactively establish information sharing agreements, such as through MoUs, and regular communication channels or engagement processes, where they determine that doing so would assist in their ability to identify and assess relevant market risks, especially during crises. Authorities should also share aggregate data on leverage in key non-bank financial sectors on a best effort basis and make use of harmonised data and metrics as much as possible when exchanging information with each other.

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 monitoring or crisis response) and/or collaboration (e.g. in supervision or policymaking).

Heterogeneous regulatory frameworks may empower authorities in different jurisdictions to use different types of policy tools to address similar risks, and hence these jurisdictions may be unable to fully harmonise policy responses. Authorities should consider that the introduction and calibration of policies to address NBFI leverage in one jurisdiction could adversely impact other jurisdictions, including by leading to regulatory arbitrage, which could transmit underlying vulnerabilities across borders and limit the effectiveness of the original intervention.

Furthermore, international cooperation and coordination amongst regulatory authorities is likely to differ in nature and depth according to its context. During a crisis, for example, 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 facilitates the sharing of relevant firm-specific data or information in compliance with authorities' legal obligations. MoUs set out the legal preconditions for exchanging information under the authorities' respective frameworks, as well as the confidentiality protections and use restrictions for the information shared, among other issues. 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.

Taken together, 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 through 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 market risks. Second, authorities should consider establishing regular communication channels or engagement processes with key peers for the purposes of sharing high-level aggregate data on leverage (subject to confidentiality limitations) and information in normal market conditions, 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 identification and 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 coordination of 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 from NBFI leverage could be compiled and disseminated amongst member authorities to inform best practice.

Annex 1: Risk metrics to monitor financial stability risks related to NBFI leverage

Vulnerabilities and financial stability risks associated with 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.[22] 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.[23] 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

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

[23] 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.[24]

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

[24] 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 and vulnerabilities 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.[25] 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.

[25] 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.