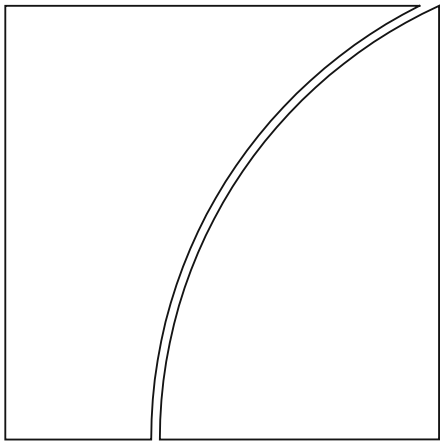
Basel Committee
on Banking Supervision



Banks' interconnections with non-bank financial intermediaries

July 2025

BIS

This publication is available on the BIS website (www.bis.org).

ISBN 978-92-9259-870-9 (online)

Contents

Executive summary 1

1. Introduction 4

2. Trends affecting bank-NBFI linkages 4

3. Linkages between banks and NBFIs 5

   3.1 Activities leading to bank-NBFI linkages 5

   3.2 Exposures of banks to NBFIs 6

4. Risks arising from interconnections between banks and NBFIs 11

   Scenario 1: Stress among NBFIs leads to credit losses or liquidity pressures for banks and other market participants 11

   Scenario 2: An NBFI's failure affects the stability of its parent banking group 14

   Scenario 3: NBFIs stop taking risks from banks 15

   Scenario 4: NBFIs stop providing funding to banks 15

5. Existing data and gaps 16

   5.1 Existing data and their limitations 16

   5.2 Data gaps 17

6. Conclusions 17

Annex – List of relevant case studies 19

Executive summary

This horizon scanning report investigates banks' interconnections with non-bank financial intermediaries (NBFIs) and aims to set out plausible stress scenarios that could impact the safety and soundness of banks. The report uses trends and case studies as the basis for formulating forward-looking scenarios. Over time, these trends are likely to evolve and new case studies are likely to emerge, potentially changing the scenarios considered. Continued monitoring and information sharing of banks' interconnections with NBFIs is imperative to better understand the risks.

NBFIs have grown rapidly since the Great Financial Crisis (GFC) and can include a broad range of entities such as investment funds, insurance companies, pension funds and other financial intermediaries, some of which may be owned by banks. International organisations and national authorities have warned about the build-up of vulnerabilities related to liquidity mismatches, elevated leverage and high interconnectedness in the sector. Steps are being taking to increase the resilience of NBFIs.[1] More broadly, these developments highlight the need to better understand the interlinkages and spillover effects between banks and NBFIs.

Trends shaping bank-NBFI linkages

Linkages between banks and NBFIs have been and continue to be shaped by market conditions and regulatory reforms since the GFC. NBFI activities expanded during the period of globally low and stable interest rates, drawing on leverage and services provided by banks. Differences between regulations for banks and those for certain NBFIs may have also created incentives to shift business activities to the NBFI sector. This supports the case for close scrutiny of the risks associated with bank interactions with NBFIs and the development of a more comprehensive framework for addressing systemic risks in the NBFI ecosystem. The impact of reforms under consideration, such as macroprudential measures for NBFIs, should in principle be good news for banks as they aim to reduce excessive demand for liquidity by NBFI. However, going forward, the reforms should be carefully assessed by bank supervisors as these reforms may reshape and further strengthen the dependencies between banks and different parts of the NBFI sector.

Activities and exposures

Linkages between banks and NBFIs arise from a wide range of activities and services and reflect a mutual dependence of these two sectors on each other. Banks provide leverage, clearing, market-making and underwriting services to NBFIs; trade derivatives with NBFIs and, in some cases, own NBFIs. These activities expose banks to credit, counterparty, liquidity, operational and market risks. NBFIs are also exposed to banks through short-term cash placements, investment in securities issued by banks and trading activities.

Risks arising from interconnections between banks and NBFIs – stylised scenarios

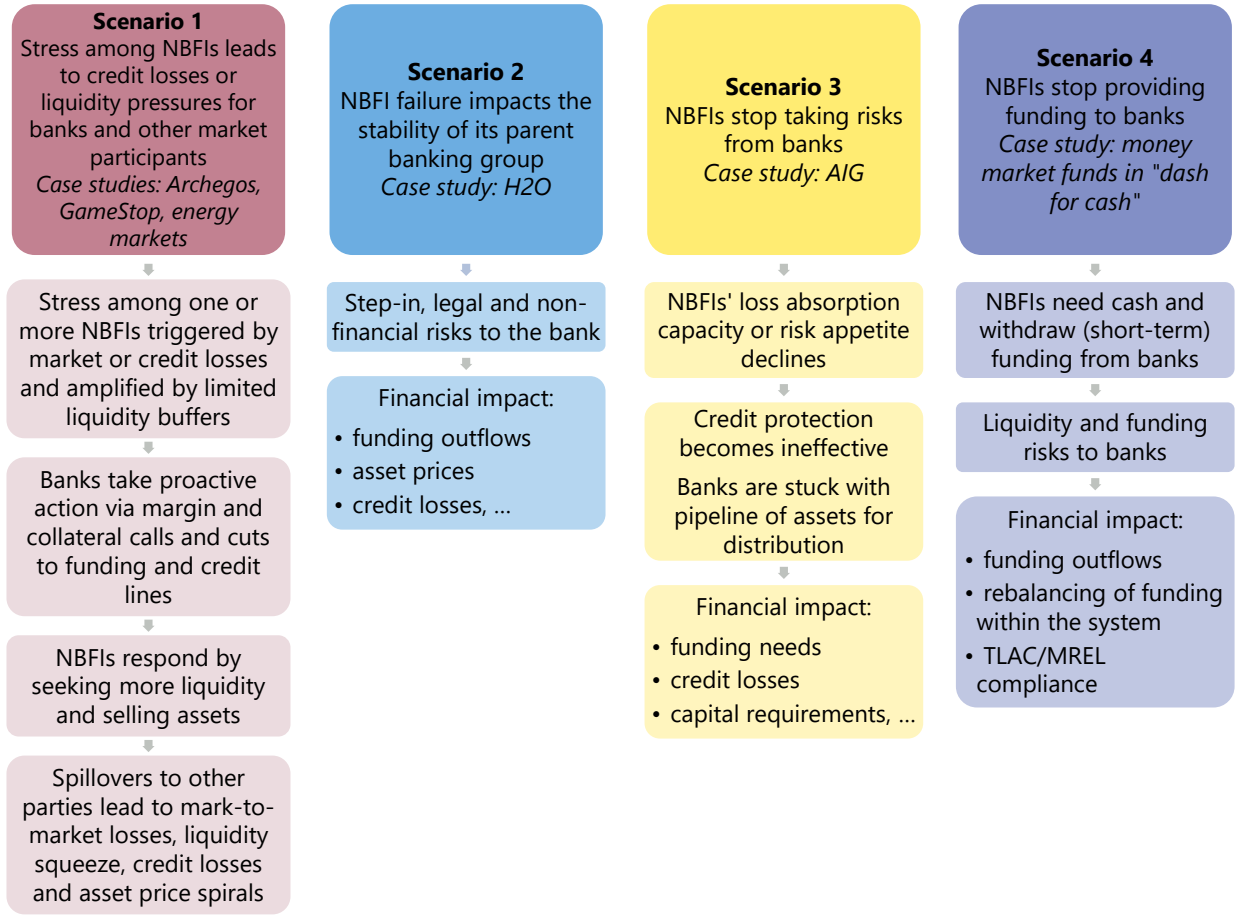
The largest, internationally active banks have become more resilient since the GFC thanks to much higher levels of capital (including higher loss absorbency requirements for global systemically important banks (G-SIBs)) and enhanced supervisory scrutiny. However, their central role in providing services to NBFIs may make the system vulnerable to procyclical reactions during market stress. If G-SIBs are less willing or able

[1] The Financial Stability Board, together with the standard-setting bodies, has undertaken work to assess and address the risks from NBFIs. See, for example, Financial Stability Board, "Non-Bank Financial Intermediation", https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/non-bank-financial-intermediation.

than other market participants to take on certain risks (especially if they reduce their activities during shocks to protect themselves from risk), then their relative rigidity could hinder the ability of the system to withstand shocks. The failure of NBFIs to meet their obligations or to provide their services to banks can have severe repercussions for financial stability by affecting banks' solvency, liquidity, funding and ability to provide financial services to customers.

To explore potential longer-term trends and related potential supervisory responses, the report builds on several case studies to discuss stylised scenarios of NBFI failure which could have a large impact on financial stability. Distress in the NBFI sector could prompt banks to reduce risk via margin calls/increased collateral requirements, loan cutbacks and asset sales. Such actions reduce risk and improve banks' regulatory metrics in the short term, but may amplify fire sale dynamics in the NBFI sector and transmit shocks across the financial system, especially if banks and NBFIs have common asset exposures. For example, margining requirements reduce the counterparty credit risk taken by banks but may expose them to liquidity risk and exacerbate market volatility (Scenario 1). Spillovers between banks and NBFIs may also occur if banks own NBFIs: bank-owned asset managers may provide support to the parent group, but they may also spread stress to the parent group if they become distressed (Scenario 2). Banks' dependence on risk transfers to NBFIs could become a systemic concern, as during the GFC (Scenario 3). Finally, reliance on funding from NBFIs may expose banks to systemic liquidity risk, which could be triggered by high outflows from NBFIs or by NBFIs' concerns about the creditworthiness of their bank counterparties (Scenario 4).

Stylised scenarios



Data needs and gaps

Granular, timely, high-frequency data are essential to understanding and monitoring bank-NBFI linkages, but supervisors often do not have access to the data they would need to comprehensively map these linkages. Supervisory data from banks typically include variables beyond exposures that help quantify the relationships and risks between banks and NBFIs, and they are sometimes available in a granular format. Supervisory data from NBFIs are often less comprehensive and may vary depending on the subsector considered.

Potential improvements for supervisory data include increasing scope, granularity and frequency. While data for mutual funds and money market funds are relatively well monitored, private and alternative investment data remain, in some jurisdictions, insufficient and fragmented, making it difficult to assess systemic risk accurately.

Even if individual supervisors have sufficient data to assess such linkages in their jurisdiction, they may face difficulties in assessing risks due to the global scope of bank-NBFI interconnections. In addition, the collection and sharing of granular data at the international level are tightly restricted, which may impede risk monitoring.

1. Introduction

Banks are connected with non-bank financial intermediaries (NBFIs)[2] through a wide range of activities and services. The Committee continues to pursue a forward-looking approach to identifying and analysing risks and vulnerabilities to the banking system with a view to safeguarding banks' resilience. As part of this work, the Committee conducted a deep dive analytical investigation on banks' interconnections with NBFIs. This report describes those connections, provides an overview of some of the exposures and describes key risk transmission channels through scenarios based on a horizon scanning discussion conducted in 2024. NBFIs have grown faster than banks since the Great Financial Crisis (GFC), and international organisations and national authorities have warned about the build-up of vulnerabilities related to liquidity mismatches, elevated leverage and high levels of interconnectedness.

Section 2 identifies examples of trends and factors which have shaped or are likely to shape banks' interconnections with the NBFI sector. Section 3 presents the wide range of services which banks and NBFIs provide to each other and the resulting exposures. Section 4 sets out four stylised scenarios which depict those risks, based on a number of case studies. Section 5 discusses the limitations of existing data, which may impair the ability of supervisors and macroprudential authorities to understand and monitor such risks. Section 6 concludes.

2. Trends affecting bank-NBFI linkages

This section discusses examples of key trends or factors which may have contributed to or are likely to shape banks' interconnections with the NBFI sector. They underscore the importance of continued attention to the interactions between banks and NBFIs as the relationship between the two sectors continues to grow and evolve.

Over recent years, monetary policy and loose financial conditions have supported the rapid growth of the NBFI sector. The recent tightening of monetary policy poses potential challenges to the NBFI sector by making it more expensive to obtain necessary funding and more difficult to manage short-term financial obligations, potentially reducing NBFIs' investment activities and overall profitability. Consequently, NBFIs may reduce their financial activities with banks (see scenarios in Section 4).

There are a variety of regulations that have likely shifted the bank-NBFI landscape. These include new bank capital requirements since the GFC and requirements to centrally clear. NBFIs face different regulation than banks do and have different business models, potentially leading to growth in non-bank lending. With respect to mandatory central clearing, many NBFIs now rely on banks for access to central counterparties (CCPs), with banks either transacting with CCPs on their behalf or sponsoring their access. Finally, recent or upcoming reviews of macroprudential policies for NBFIs, such as those considered in the European Commission's recent targeted consultation,[3] the new liquidity facility for NBFIs by the Bank of England[4] or the money market fund (MMF) reforms proposed or adopted in the United States[5] and United

[2] In this report, the NBFI sector is defined as a broad range of entities such as investment funds, insurance companies, pension funds and other financial intermediaries. It also includes entities which may be consolidated into banking groups.

[3] See European Commission, *Macroprudential policies for non-bank financial intermediation (NBFI)*, May 2024, finance.ec.europa.eu/capital-markets-union-and-financial-markets/financial-markets/macroprudential-policy/macroprudential-policies-non-bank-financial-intermediation-nbfi_en.

[4] See Bank of England, "Contingent NBFI Repo Facility (CNRF)", *Explanatory Note*, no 24, July 2024, www.bankofengland.co.uk/markets/market-notices/2024/july/contingent-nbfi-repo-facility-explanatory-note.

[5] See Securities and Exchange Commission, *Money market fund reforms – Fact sheet*, July 2023, www.sec.gov/files/33-11211-fact-sheet.pdf.

Kingdom,[6] could have an impact on bank-NBFI linkages going forward. Demand from NBFIs for lending by banks may decrease, and NBFI deposits with banks may increase.

Technology has and will continue to shape the competitive and collaborative relationships between banks and NBFIs, presenting both challenges and opportunities for banks. Some technological innovation may cause activity to partly or entirely migrate from the banking sector to the NBFI sector, reducing banks' market power. This can happen when fintech companies within the NBFI ecosystem offer innovative products and services which compete with traditional banking. For example, distributed ledger technologies can be used to process certain types of transaction without involving the banking system at all. More commonly, innovation changes the role of banks in the delivery of financial services. For example, fintech brokers might draw deposits away from banks by offering attractive investment services, but would place some customer balances with banks.

Given the aging population in many countries, the demand for retirement, insurance and investment products managed by NBFIs is likely to increase. The resulting growth of the NBFI sector may strengthen bank-NBFI linkages.

3. Linkages between banks and NBFIs

3.1 Activities leading to bank-NBFI linkages

There are a number of activities that connect banks and NBFIs today, although an NBFI would usually be involved in only a subset of these activities:

- **Lending**: Banks help NBFIs leverage their balance sheets via a wide range of services involving credit extension. This also includes synthetic lending via derivatives. This increased leverage can amplify systemic risk, particularly if multiple NBFIs rely on the same banks for leverage or if banks lend to multiple NBFIs to fund the same activity.[7] Banks also incur credit and counterparty credit risk (CCR) if an NBFI fails on its obligation.
- **Liquidity management**: Banks help NBFIs place spare cash by accepting deposits, borrowing cash through repurchase agreements (repos) and selling debt instruments such as commercial paper, covered and unsecured bonds, and asset-backed securities. They help NBFIs raise cash through the opposite activities. Banks may also provide contingent credit facilities to NBFIs. Banks face liquidity risks which could materialise if NBFIs withdraw cash or approach them with buyback requests.
- **Clearing services in centrally cleared markets**: When NBFIs want to access centrally cleared products but are unable to interact directly with CCPs, they can do so through banks, which act as clearers. Depending on the clearing model, banks can incur a mix of counterparty and contingent liquidity risk which could crystallise if the NBFI fails to meet margin calls.
- **Market-making and underwriting**: Banks operate as market-makers, facilitating NBFIs' trading in debt and equity securities and OTC derivatives. In some cases, banks might commit to take securities issued by NBFIs onto their own balance sheets (for example if underwriting credit issuance by an NBFI). Through these activities, banks incur market risk and/or credit risk or CCR, which could materialise if NBFIs face losses on their trades or are not able to raise market funding.

[6] See Financial Conduct Authority, "Updating the regime for money market funds", *Consultation Paper*, no CP23/28, December 2023, www.fca.org.uk/publications/consultation-papers/cp23-28-updating-regime-money-market-funds.

[7] For example, when a bank provides subscription finance to a private equity fund created with the purpose of acquiring a given company and then also provides funding for operational activities directly to that company.

Separately, banks' market-making obligations might make it difficult for them to reduce exposures to certain markets, including when those markets are volatile because of actions by NBFIs (for example if NBFIs are liquidating assets in response to a shock). This creates indirect exposures to NBFIs' vulnerabilities.

- **Insuring creditworthiness and asset values**: By providing guarantees or other forms of security, banks help NBFIs enhance their creditworthiness. At the same time, banks also transfer risks to NBFIs by buying credit protection, either via credit derivatives or synthetic securitisations. Bank asset values may also depend on protection provided by NBFIs to third parties, for example mortgages secured on insured property. Banks thus incur counterparty and credit risk which could materialise if NBFIs' ability to take on assets or deliver protection is impaired.
- **Managing assets**: Some NBFIs (for example mutual funds) outsource asset management activities to banks (or to entities which are parts of banking groups). This creates a dependency on banks' asset management performance and expertise. In the long term, banks' business models and profitability can be threatened if their franchises weaken or earnings are competed away.
- **Ownership and sponsorship**: Some NBFIs are owned by banks (these are entities that are part of banking groups but which would be classified as NBFIs if they were standalone entities). If large enough, a bank-owned NBFI can create income volatility for the bank, which may threaten the bank's viability. Banks might also be exposed to legal and conduct risks arising from the activities of bank-owned NBFIs or face step-in risk when an NBFI fails (for example, meeting the losses of a special purpose vehicle).[8]

None of these linkages are unique to banks and NBFIs; banks interact with many counterparties, most of which are not NBFIs. Whether risks are different when NBFIs are involved depends on the characteristics of banks' exposures to NBFIs and the ways in which risks can crystallise.

3.2 Exposures of banks to NBFIs

The activities described above give rise to exposures between banks and NBFIs. This section provides a quantitative overview of those exposures with insights based on supervisory data on banks in the euro area, the United States, China, Japan and Hong Kong SAR.

Euro area

Euro area banks' exposures to NBFIs have been broadly stable over time, with funding from NBFIs to banks significantly exceeding claims on NBFIs. Asset exposures have been relatively flat, although within them, loans and the positive fair value of derivatives have gradually increased while reverse repo lending to NBFIs has slightly declined (Graph1.A). On the funding side, the scope of supervisory data allows for identification of bank debt securities held by NBFIs. Unsecured deposits are the most significant funding instrument, followed by NBFIs' debt securities holdings and repo loans from NBFIs (Graph 1.B).[9]

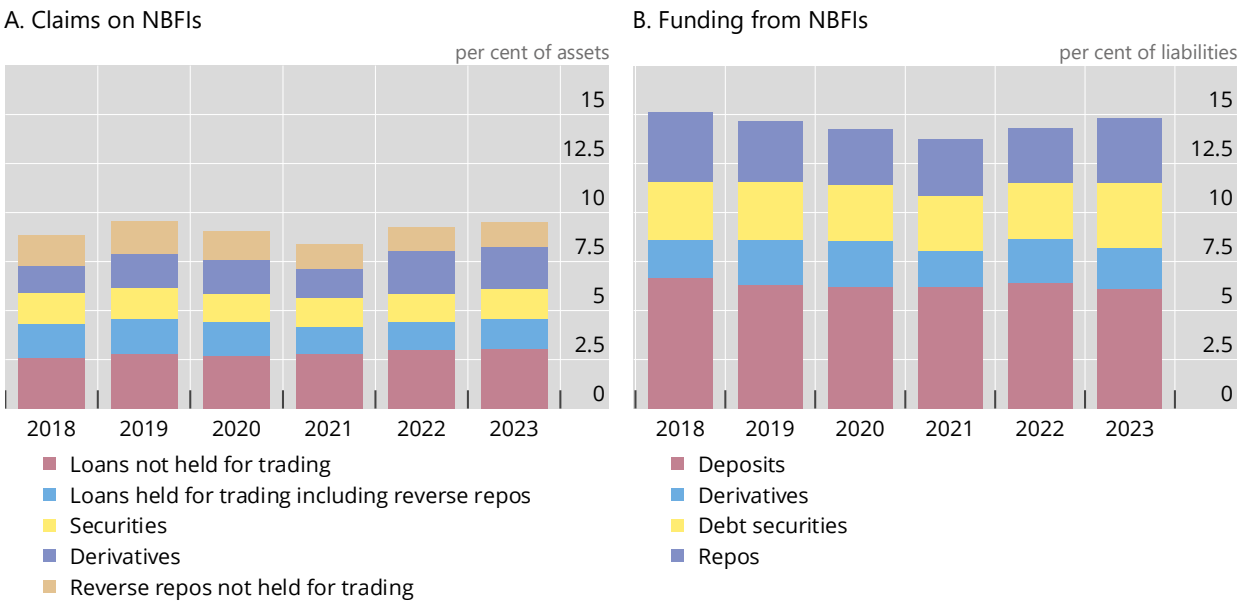
NBFI repo and deposit funding of euro area banks is characterised by a very short average maturity. Debt securities funding consists of two distinct segments. MMFs provide a major part of short-term commercial paper and certificate of deposit funding, often in US dollars. Insurers, investment funds and pension funds play an important role as long-term investors in bank covered bonds and senior bonds.

[8] In 2017, the Basel Committee on Banking Supervision issued guidelines to mitigate step-in risk; see Basel Committee on Banking Supervision, *Guidelines on identification and management of step-in risk*, October 2017, www.bis.org/bcbs/publ/d423.pdf.

[9] As for the asset-side exposures, some of these liabilities ultimately come from banking groups via their NBFI subsidiaries. However, the limited availability of granular liability data does not allow for a precise assessment.

Exposures between banks and NBFIs often have an international dimension, as euro banks trade with globally active and/or foreign-based NBFI counterparties.[10]

Euro area banks' claims on and funding from NBFIs — Graph 1



End-2022. Loans held for trading include mainly reverse repos not reported as such. Values reported in line with applicable accounting standards.

Source: E Franceschi, M Grodzicki, B Kagerer, C Kaufmann, F Lenoci, L Mingarelli, C Pancaro and R Senner, "Key linkages between banks and the non-bank financial sector", *Financial Stability Review*, European Central Bank, May 2023, pp 111–18.

A small group of large, complex and internationally active euro area banks account for a disproportionately large share of exposures to NBFIs. The top 10 banks supervised by the European Central Bank (ECB), including all euro area G-SIBs, hold about 70% of claims on NBFIs and about 60% of NBFI funding, but make up about 55% of total banking assets (Graph 2.A). Derivative exposures are concentrated in fewer banks as only a very small number of euro area banks trade equity, commodity and credit derivatives with NBFIs (Graph 2.B). These banks are the centre of the network of CCR exposures and tend to be connected to many NBFIs. Thanks to the high capital levels of these banks, potential contagion would likely be contained, but substitutability of large banks in the network may be limited (Box 1).

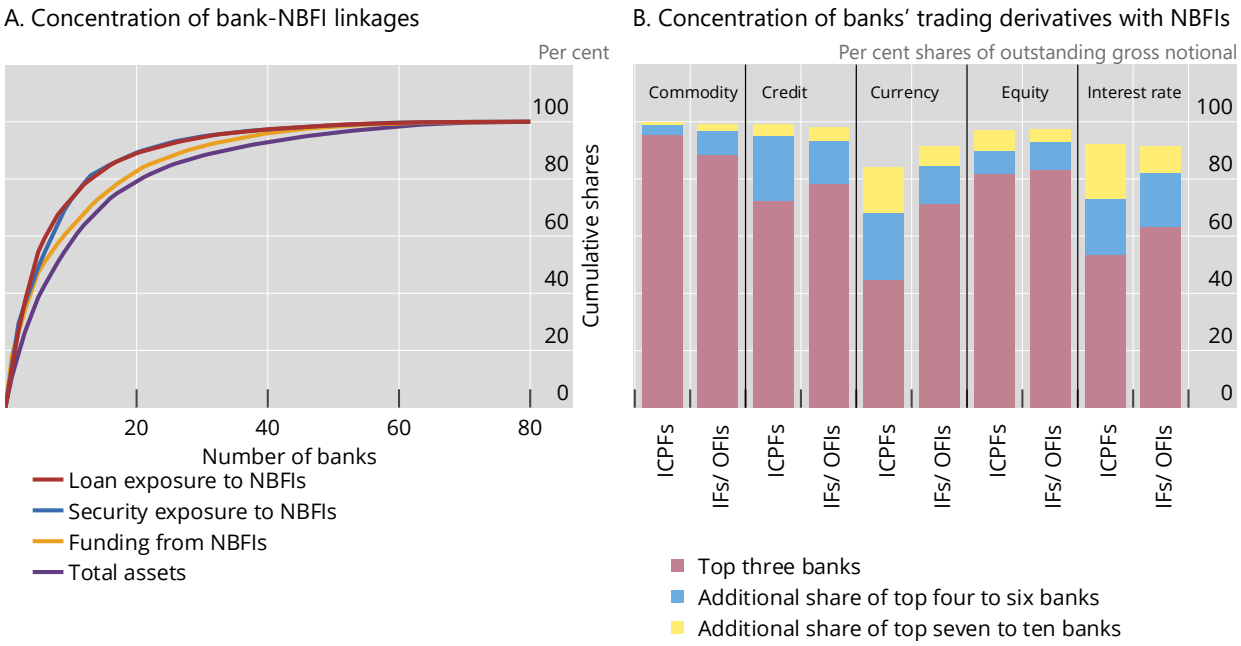
Finally, euro area banking groups are also owners of NBFIs. Most of the large asset managers in the euro area belong to a banking group, and several euro area G-SIBs have sizeable insurance operations.[11]

[10] For example, foreign NBFIs account for about two thirds of French banks' claims on NBFIs and funding from NBFIs. See Bank of France, *Assessment of risks to the French financial system*, December 2023, www.banque-france.fr/en/publications-and-statistics/publications/assessment-risks-french-financial-system-december-2023.

[11] Most EU asset managers belong to banking and insurance groups, while in the United States most asset managers are independent. The US asset managers are more concentrated, with the top 25 holding more than 70% of assets under management (AUM), while in the European Union the top 50 hold around 70% of AUM. A large share of EU-domiciled investment funds are managed by non-EU-domiciled entities, with US managers representing 33% of fund assets. See European Systemic Risk Board, "EU Non-bank Financial Intermediation Risk Monitor 2024", *NBFI Monitor*, no 9, June 2024, www.esrb.europa.eu/pub/pdf/reports/nbfi_monitor/esrb.nbfi202406~2e211b2f80.en.pdf.

Concentration of euro area banks' linkages with NBFIs

Graph 2



Panel A: data as of end-2023 for 80 banks directly supervised by the ECB. Panel B: ICPFs = insurance companies and pension funds; IFs = investment funds; OFIs = other financial institutions.

Source: E Franceschi, M Grodzicki, B Kagerer, C Kaufmann, F Lenoci, L Mingarelli, C Pancaro and R Senner, "Key linkages between banks and the non-bank financial sector", *Financial Stability Review*, European Central Bank, May 2023, pp 111–18.

United States

In the United States, NBFIs have seen faster asset growth than banks in recent years and now account for nearly 75% of US financial sector assets (Graph 3). While US banks are significantly exposed to the NBFI sector, neither the asset- nor the liability-side interconnections appear to be concentrated in any individual sector of NBFIs in aggregate. The greatest on-balance sheet exposure is to government-sponsored enterprises (GSEs), with 11% of bank assets represented by claims on GSEs.[12] While this analysis is limited to on-balance sheet exposures, banks can also be exposed to NBFIs through certain derivative and securities financing transactions that result in off-balance sheet exposure but, due to accounting and netting rules, low to no on-balance sheet exposure.

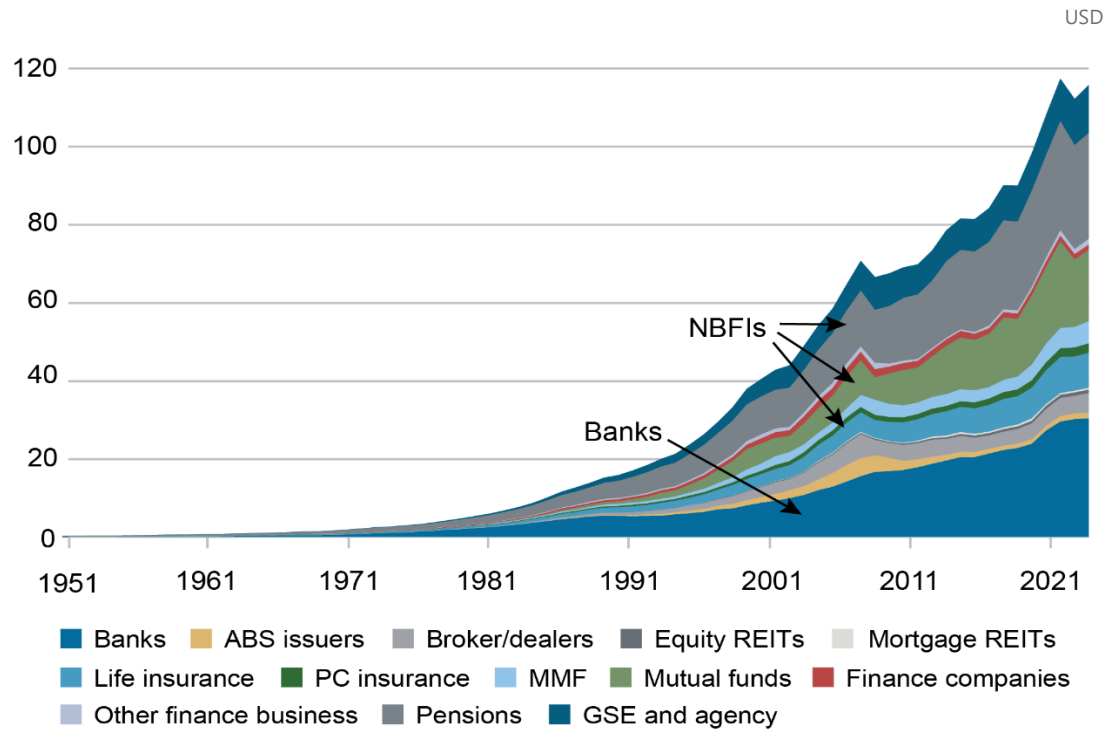
By contrast, individual NBFI sectors are tightly connected to banks. While the composition of US banks' liabilities to NBFIs is similar to that of euro area banks, assets are generally concentrated in wholesale lending, repos/securities financing or derivatives.[13] NBFIs in the United States use a vast set of derivatives for many purposes (eg synthetic exposures, arbitrage trades, hedging) and often establish these transactions through bank-affiliated dealers. Through all three types of exposure, banks are a significant source of funding for the NBFIs. Individual NBFI sectors are, in general, not tightly connected to each other.

[12] See V Acharya, N Cetorelli and B Tuckman, "Where do banks end and NBFIs begin?", *NBER Working Paper*, no 32316, April 2024, Figure 4c, p 40, www.nber.org/system/files/working_papers/w32316/w32316.pdf.

[13] See V Acharya, N Cetorelli and B Tuckman, "Where do banks end and NBFIs begin?", *NBER Working Paper*, no 32316, April 2024, Figure 2, p 34, www.nber.org/system/files/working_papers/w32316/w32316.pdf.

Total assets of US banks and NBFIs

1951–2023 Graph 3



Sources: V Acharya, N Cetorelli and B Tuckman, "Nonbanks are growing but their growth is heavily supported by banks", Federal Reserve Bank of New York, *Liberty Street Economics*, June 2024; financial accounts of the United States (Flow of Funds statistics).

Since the GFC, certain financial activities in the United States, such as mortgage warehousing and certain securitisation activities, have shifted away from banks and towards NBFIs. This has made it appear as if these risks have moved out of the banking system. However, banks are exposed to these activities via direct lending to NBFIs. In most cases, NBFIs obtain direct loans to fund business, and banks mitigate risks from these NBFIs by obtaining collateral and via other methods.[14] In addition to the lines provided to securitised lending, collateralised with the underlying assets, US banks provide funding through capital call subscription lines as an additional form of lending exposure. These facilities provide lines to private equity funds in order to provide liquidity and bridge investments before calling capital from the limited partner investors. Capital call exposures are secured by a large, diversified pool of limited partner investors, with facilities governed by borrowing structures.

China

China's financial system is dominated by banks, and NBFIs account only for a small share of the entire system. Commercial banks and NBFIs are widely connected through various channels. Commercial banks have exposures to various NBFIs through bond investments, repos, lending etc. Commercial banks also hold shares of MMFs. In turn, asset managers and other NBFIs hold deposits, certificates of deposit and

[14] For example, to mitigate risks from these borrowers, large US banks rely on secured transactions with appropriate structural enhancements, including concentration limits, recourse/partial recourse, cross-collateralisation, cash sweeps, repayment requirements and performance tests to ensure sufficient downside protection through periods of stress.

bonds issued by banks, and they obtain financing from banks.[15] As of end-July 2024, Chinese banks are net borrowers from the NBFI sector, as their claims on NBFIs amount to 6.6% of total assets and their liabilities to NBFIs amount to 7.7% of total liabilities. In recent years, these shares have remained stable.

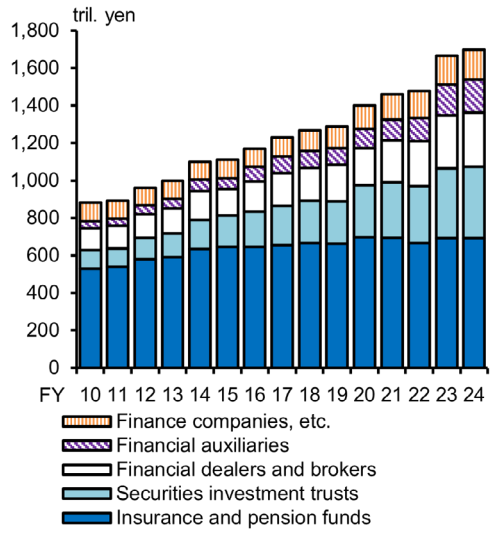
Japan

In Japan, where depository financial institutions are still dominant in financial intermediation, the share of financial assets held by NBFIs has remained at about 30% in the last decade, although the amount of assets held has been increasing (Graph 4.A).[16] Japanese NBFI sectors consist of traditional insurance companies, pension funds, securities investment trusts, and dealers and brokers. The increase in AUM and the resultant expansion in market funding have contributed to an increase in the interconnectedness between NBFIs and banks (Graph 4.B).

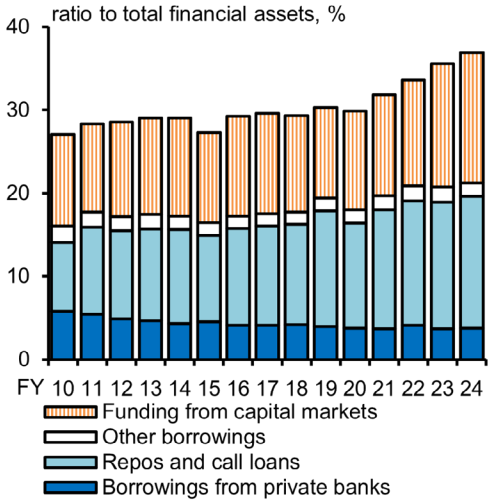
Balance sheets of Japan's NBFIs

Graph 4

A. Assets



B. External funding of NBFIs



Panel A: "Financial auxiliaries" includes financial holding companies, stock exchanges and financial instruments exchanges. "Finance companies etc" includes finance companies, securities finance companies and the Resolution and Collection Corporation.

Source: Bank of Japan, *Financial System Report*, October 2024.

[15] Among various NBFIs, asset management products span numerous financial institutions and financial markets, with a relatively large market size. They are closely connected to banks and other financial institutions in terms of funding sources and asset investments. The People's Bank of China and the National Financial Regulatory Administration have worked to encourage the asset management sector to focus on its main business and have clarified the risk-sharing mechanisms, set strict rules on liquidity management and an upper limit of leverage, and prohibited issuers from offering principal-guaranteed wealth management products. Commercial banks are required to establish wealth management subsidiaries which conduct asset management business as independent legal entities

[16] The share of financial assets held by each entity in the financial system in Japan is 30% for NBFIs, 48% for depository financial institutions, 15% for central banks and 7% for public financial institutions (figures are as of end-2022). Here, NBFIs include all financial institutions that are not depository financial institutions, central banks or public financial institutions.

Hong Kong SAR

The Hong Kong banking sector's exposures to NBFIs on both the asset and funding sides grew between 2019 and 2022 before declining moderately in 2023. As of end-2023, Hong Kong banks' claims on and liabilities to NBFIs were broadly balanced and accounted for 12% of total bank assets and total bank liabilities, respectively. On the asset side, most of Hong Kong banks' claims on NBFIs are to (i) CCPs,[17] (ii) public financial institutions, (iii) NBFIs owned by banking groups and (iv) holding companies and financing and investment arms of non-financial corporate groups. The remainder comprise mainly claims on securities firms and insurance companies. The picture on the funding side is similar, with CCPs and NBFIs owned by banking groups accounting for the largest shares of Hong Kong banks' liabilities to NBFIs.

By instrument type, loans and debt securities dominate Hong Kong banks' claims on NBFIs. On the funding side, deposits are a major funding instrument. Unlike their global peers, Hong Kong banks do not source material amounts of debt securities funding from NBFIs.

4. Risks arising from interconnections between banks and NBFIs

Activities connecting banks and NBFIs give rise to a full range of risks: credit, counterparty, liquidity, operational and market risks. Some of these risks are merely transformations of existing risks. For instance, to meet potential investor redemptions, investment funds are encouraged to maintain sufficient liquidity buffers by depositing cash with banks. This practice intensifies the link between the two sectors, transforming liquidity risk in the NBFI sector into liquidity risk in the banking sector.

When large and interconnected NBFIs fail, these risks may lead to losses among the banks exposed to such NBFIs, as well as to a broader market instability affecting other banks. If the impacted banks have weaknesses in their capital or liquidity buffers, they may amplify stress, transmitting it to other banks and NBFIs. To explore potential longer-term trends and related potential supervisory responses and preventive measures, this section sets out four stylised scenarios of NBFI failure. The report reviews historical examples to identify those which could have a large impact on financial stability. The scenarios build on a number of case studies set out in the Annex. The scenarios are non-exhaustive and do not aim to provide a complete list of mechanisms through which banks can be exposed to NBFI failures.

Scenarios 1 and 2 explore risks that arise from existing links between banks and NBFIs. Scenarios 3 and 4 explore risks that could arise if NBFIs change the way they interact with banks.

Scenario 1: Stress among NBFIs leads to credit losses or liquidity pressures for banks and other market participants

Stress among one or more NBFIs could affect the banking sector through several direct and indirect channels. Banks may react to stress in the sector by taking protective actions such as increasing margin requirements or reducing their exposures to troubled entities or NBFI sectors.

These protective actions, while aimed at mitigating an individual bank's risk, can exacerbate liquidity strains and market volatility. In response to higher margin calls and a withdrawal of bank funding, distressed NBFIs may need to liquidate assets to generate liquidity and avoid additional losses. The forced liquidation of assets could lead to losses for the banks and NBFIs holding such assets, potentially creating a fire sale spiral. Recent examples of this phenomenon include:

[17] Hong Kong banks' claims on and liabilities to CCPs represent mainly the gross fair values of centrally cleared exposures before netting.

- In September 2022, a severe repricing of UK financial assets exposed vulnerabilities associated with liability-driven investment (LDI) funds. Banks were directly exposed to CCR from LDI funds through gilt repo borrowing and derivative contracts. Margin calls issued by banks to LDI funds intensified the liquidity pressures, and the resultant selling behaviour by LDI funds led to further market repricing.
- In early 2022, a sharp increase in volatility in energy markets led to an increase in margin requirements for commodity derivatives, creating liquidity pressures for some commodity traders that risked spreading to other markets.

While the banking sector may seek to reduce its exposures to distressed NBFIs, it is also possible that distressed firms seek additional liquidity from banks as they approach default, especially if banks offer relief on margin requirements to prevent the wrong-way risk effects of margin calls.[18,19] Other NBFIs or market participants with exposures to troubled NBFIs or distressed assets (eg private equity funds with exposures to stressed NBFIs) could also seek precautionary liquidity from the banking sector. This could lead to an increase in banks' own liquidity needs as well as their exposure to CCR.

NBFIs that are unable to manage their liquidity needs in such scenarios could default on their obligations. To the extent that NBFIs use banks to finance their investments, this could lead to direct credit losses for those banks. Banks could experience further losses if they are directly exposed to the assets sold by NBFIs or to other NBFIs holding such assets (eg via margin loans or subscription lines).

Banks may react to this scenario by curbing lending to funds, selling the collateral posted by a defaulting NBFI and closing out any hedges taken to offset the related positions. Such a reaction would add to fire sale pressures and depress asset prices further, potentially triggering additional margin calls and liquidity pressures on other market participants.[20]

This dynamic is not limited to derivative exposures and financial markets. Common credit exposures, such as lending to the commercial real estate (CRE) sector, could serve as a trigger for the dynamics described. Banks and real estate alternative investment funds (REIFs) have significant common exposures to CRE assets.[21] The failure of a large REIF may lead to fire sales and trigger similar dynamics, in particular if REIFs use bank funding for their investments.[22] Private credit funds, which have been recently expanding their lending to borrowers traditionally funded by banks, are another area where this scenario

[18] In the case of OTC derivatives, banks typically have matched positions with other banks against the client positions, so impacts to derivative positions and closeouts could spill over to other banks, setting off closeouts across the broader market (although this is partially mitigated by the fact that OTC derivatives are typically centrally cleared). However, when banks are clearing through CCPs on behalf of NBFI clients and increased volatility leads to higher margin calls, banks face increased counterparty and contingent liquidity risks if clients miss margin payments.

[19] Aspects of these dynamics were analysed as part of the Bank of England's system-wide exploratory scenario; see Bank of England, *The Bank of England's system-wide exploratory scenario exercise final report*, November 2024, www.bankofengland.co.uk/financial-stability/boe-system-wide-exploratory-scenario-exercise/boe-swes-exercise-final-report.

[20] This dynamic was seen during the failure of Archegos in early 2021. Archegos failed to meet margin calls after sharp declines in the price of certain securities to which it was exposed. Archegos' counterparties sought to reduce their exposures following its failure by selling securities they had used to hedge their derivative exposures. This ultimately led to around US$10 billion of losses spread among global investment banks with exposures to the firm. See European Securities and Markets Authority, "Leverage and derivatives – the case of Archegos", *Trends, Risks and Vulnerabilities Analysis*, May 2022, www.esma.europa.eu/sites/default/files/library/esma50-165-2096_leverage_and_derivatives_the_case_of_archegos.pdf.

[21] See P Daly, E Ryan and O Schwartz Blicke, "Mapping the maze: a system-wide analysis of commercial real estate exposures and risks", *European Central Bank Macroprudential Bulletin*, no 25, November 2024, www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu202411_01~98f5aa8d45.en.html.

[22] REIFs are financing approximately 27% of the CRE market in the European Union. See European Securities and Markets Authority, "Real estate markets – risk exposures in EU securities markets and investment funds", *Trends, Risks and Vulnerabilities Analysis*, January 2024, www.esma.europa.eu/sites/default/files/2024-01/ESMA50-524821-3038_Real_estate_markets_-_risk_exposures_in_EU_securities_markets_and_investment_funds.pdf.

could materialise.[23] However, available data may not be sufficient to fully understand the risks emanating from those funds.

More generally, the magnitude of the spillover effects following the default of an NBFI is typically difficult to assess ex ante unless granular enough data on exposures and NBFI balance sheet characteristics are available (Box 1).

Box 1

Measuring contagion risk stemming from banks' CCR exposures to NBFIs

The use of derivatives by NBFIs is growing.[1,2] Derivative transactions can give rise to CCR,[3] which may create shock transmission and amplification channels in the banking system. The level of CCR in the financial system depends on the interconnectedness between banks and NBFIs.[4]

Graph 5 shows metrics of interconnectedness. First, there are eight communities ("community hubs") identified, indicating how many banks may be directly affected by the default of a counterparty (both banks and NBFIs). Second, banks that are more central to the network structure (measured by "betweenness" centrality) may contribute to knock-on effects. NBFIs do not appear to be central from that perspective; ie with the exception of one financial auxiliary, no NBFI would contribute to the transmission of shocks resulting from the default of a counterparty from one bank to another. Finally, banks are connected through just a few links, so shocks, including those stemming from the NBFI sector, may propagate quite broadly in just a few stages.

The network of CCR exposures allows us to run some stylised simulations to assess which links between banks and NBFIs may transmit stress. The simulation uses a stylised mechanism of loss transmission following the default of the two most vulnerable NBFI counterparties (ie those with the highest default probability) and assuming a 100% loss-given-default for the exposed banks. The model considers a very simplistic default criterion: each bank experiencing a loss of at least 100 basis points in risk-weighted exposure amounts (REAs) is assumed to default on all CCR exposures. The aggregate results of the simulations show that G-SIBs appear most exposed to NBFI CCR; however, the impact is still quite limited, amounting to 17 basis points in REAs. Universal banks and investment banks also appear to be exposed to the shocks from NBFI defaults by up to 10 basis points in REAs. Second-round effects are muted due to a rather sparse and fragmented network of exposures.

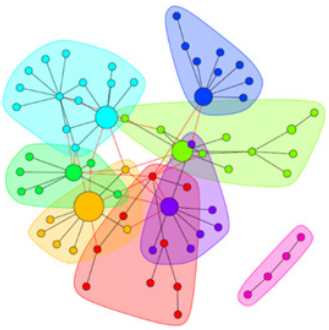
However, these conclusions should be interpreted with caution since indirect shock amplification channels could be sentiment-based, as described in Scenario 1 in Section 4, ie when investors rush to relocate their positions in case of a disruption affecting a specific NBFI, resulting in an adverse impact on their market value and implying losses for banks and other financial institutions that hold them in their books.

[23] See International Monetary Fund, "The last mile: financial vulnerabilities and risks", *Global Financial Stability Report*, April 2024, www.imf.org/en/Publications/GFSR/Issues/2024/04/16/global-financial-stability-report-april-2024; and K Cera, P Daly, L Hermans, P Molitor, O Schwartz Blicke, A Sowiński and E Telesca, "Private markets, public risk? Financial stability implications of alternative funding sources", *European Central Bank Financial Stability Review*, May 2024, www.ecb.europa.eu/press/financial-stability-publications/fsr/special/html/ecb.fsrart202405_03~bc23a48dbc.en.html.

Measures of interconnectedness in the CCR exposures network Based on 2023 European Union-wide stress test data	Graph 5

A. Community hubs (which banks could be immediately impacted by CCR-related default)

Links indicate stress CCR exposures (only higher than median shown); coloured regions show different exposure communities



B. Betweenness (which banks can transmit CCR default shocks across the system)

Links indicate stress CCR exposures (only higher than median shown); size of nodes proportional to betweenness

Community detection is based on the algorithm from A Clauset, M Newman and C Moore, "Finding community structure in very large networks", *Physical Review E*, vol 70, no 6, December 2004.

Source: C Barbieri, M Grodzicki, G Halaj and R Pizzeghello, "System-wide implications of counterparty credit risk", *European Central Bank Macroprudential Bulletin*, no 26, January 2025.

[1] See E McCaul, "Supervising counterparty credit risk – a European perspective", keynote speech at the industry outreach conference on counterparty credit risk management, New York, 28 February 2024, www.bankingsupervision.europa.eu/press/speeches/date/2024/html/ssm.sp240228~a9397948a8.en.html. [2] See M Robinson and S Tornielli di Crestvolant, "Financial stability risks from non-bank financial intermediation in Australia", *Reserve Bank of Australia Bulletin*, April 2024, www.rba.gov.au/publications/bulletin/2024/apr/financial-stability-risks-from-non-bank-financial-intermediation-in-australia.html. [3] See S Markose, "Systemic risk from global financial derivatives: a network analysis of contagion and its mitigation with super-spreader tax", *IMF Working Papers*, no 12/282, November 2012, www.imf.org/en/Publications/WP/Issues/2016/12/31/Systemic-Risk-from-Global-Financial-Derivatives-A-Network-Analysis-of-Contagion-and-Its-40130. [4] See A Haldane, "On counterparty risk", *Journal of Risk Management in Financial Institutions*, vol 5, no 3, April 2012, pp 224–6.

Scenario 2: An NBFI's failure affects the stability of its parent banking group

As described in Section 3, banking groups are often exposed to NBFIs via ownership in the NBFI. While they provide risk and income diversification, such links can also expose banks to risks. Banks may be expected to step in when their NBFI subsidiaries and affiliates are in financial difficulty and fulfil their obligations. Step-in risk may be limited by regulations,[24] but banks may still face non-financial risks. The failure of a banking group's NBFI subsidiary may also lead to conduct risks and other non-financial risks, with banks facing financial consequences, as illustrated by the spillovers from H2O to its parent Natixis, which depressed the share price and increased the funding cost of Natixis.

Spillovers through ownership links can operate in both directions. Bank-owned asset managers may decide to step in and provide support to the parent company. But these asset managers may also be vulnerable if the parent company becomes distressed. For example, outflows from asset managers owned by Credit Suisse were driven by concerns about the stability of the bank, despite it being a separate entity.

[24] For example, in the European Union, MMF regulation prohibits the parent bank from providing external support to the MMFs managed by an affiliated manager.

The ownership tie was enough to trigger outflows. These outflows could in turn affect separate banks that were funded by the failing bank's asset management arm.

Scenario 3: NBFIs stop taking risks from banks

Section 3 describes the role that NBFIs play in providing credit insurance. NBFIs facilitate banking activities by taking over risks assumed by the banking sector. On the NBFI asset side, this is done through investments into debt and equity originated and arranged by banks (syndicated loans and collateralised loan obligations (CLOs) being examples of the latter). On the NBFI liability side, this includes providing credit protection through mortgage insurance, credit insurance, credit default swaps (CDS) and other risk transfer methods.

Banks that rely on risk transfer provided by NBFIs would face the CCR of their NBFI counterparty. Concentration of risk transfers at a small number of NBFIs could make this a systemic concern. During the GFC, NBFIs' underestimation and concentration of risk, such as credit default protection (eg AIG for CDS) and mortgage and bond default insurance (eg US monoline firms), were major sources of systemic instability.

Stressed NBFIs may not be able to absorb the risks transferred to them by banks. Prolonged periods of higher interest rates and distressed financial conditions create challenges to NBFIs' funding and loss absorption capacity. For example, credit funds (especially those investing in illiquid bonds) may face higher redemptions in such a scenario, as delayed recognition of asset devaluation could create first-mover advantages. In such a stressed scenario, credit funds may stop buying CLOs and providing protection through synthetic securitisations. That would expose banks to credit risk and funding risk as assets intended for distribution would stay with the banks and absorb capital and funding. Insurers may stop providing coverage necessary to underwrite mortgage and other credit protection insurance, for example due to a reassessment of natural risk or mortality risk, which could make banking activities more expensive or even unaffordable. This reassessment of risk can eventually lead to a tightening of credit conditions by banks.

Scenario 4: NBFIs stop providing funding to banks

Section 3 describes the liquidity management role that banks play for NBFIs. Many NBFIs, such as investment and money market funds, offer short-term liquidity to their customers while investing in longer-term assets which may not be immediately liquidated. This asset-liability mismatch makes NBFIs susceptible to liquidity crises if there is an abrupt surge in redemption requests and market liquidity is insufficient to liquidate assets. NBFIs usually hold their liquid assets as very short-term deposits with banks, repo transactions or short-term high-quality debt securities, often issued by banks.

This scenario may be triggered by outflows from the NBFI or by concerns about banks' credit quality. NBFIs which place their liquid assets with a bank are likely to be highly sensitive to the credit quality of that bank. They may withdraw funding in the face of doubts about the bank's ability to repay creditors or about the quality of collateral the bank can provide.[25] If NBFI customer outflows exceed normal levels, funding pressures can spill over to banks, often through complex liquidity chains. For example, in March 2020, euro area NBFIs had to mobilise cash to meet margin calls on interest rate trades. These NBFIs responded by withdrawing cash from euro area MMFs. In turn, MMFs raised liquidity, also by not rolling over maturing short-term bank debt securities, thereby forcing the banks to either liquidate their high-quality liquid assets or to substitute NBFI funding via other short-term funding. If many NBFIs are affected

[25] Long-term NBFI debt investors may have a higher tolerance for credit risk, but would demand a premium from weaker banks, which can often be unaffordable for the issuing bank.

by liquidity pressures and these NBFIs hold liquidity with a small group of banks, then the banking sector itself may face liquidity shortages and could be forced to tighten financing conditions for the real economy.

This scenario could materialise very quickly, owing to the very short maturities of NBFI deposit, repo, commercial paper and FX swap funding. Substitution of NBFI funding may be difficult in times of stress: during the "dash for cash" in March 2020, MMFs requested that banks buy back their own commercial paper. The short-term bank debt market remained frozen, so banks met redemption requests with other liquidity sources. More generally, euro area data show that the loss of short-term repo funding from investment funds is usually followed by further repo withdrawals by other investment funds.[26] At the system level, redemptions from an NBFI would be offset by new deposits held by the NBFI's clients. However, these clients may have deposit relationships with banks other than those servicing the NBFI, so these new deposits would not necessarily mitigate the liquidity stress faced by some banks. In the longer term, losing market access to longer-term debt issued to NBFIs can imply challenges for banks in meeting net stable funding requirements and requirements to issue bail-in-able liabilities.

5. Existing data and gaps

Section 2 used data from a variety of sources to describe banks' exposures to NBFIs. The information provided by supervisory data is useful, but it has a variety of limitations, including comparability, as highlighted by the different information provided by each jurisdiction. The rest of this section discusses the existing data and their limitations and sets out some considerations on data gaps.

5.1 Existing data and their limitations

A widely used data source globally is the national financial accounts, which contain the sector of the creditor and the debtor for each relevant category of asset and liability. However, financial accounts have several limitations. First, they are based on unconsolidated and territorial data, displaying interdependencies internal to consolidated financial groups while not capturing the links of domestic entities' foreign subsidiaries and branches.[27] Second, they often only capture links between domestic banks and NBFIs, overlooking important cross-border linkages. Third, they only document the size of on-balance sheet exposures at the reporting date, excluding off-balance sheet links and potential future exposures in the case of derivative transactions. Finally, they are only available with a lag and come at a low – usually quarterly – frequency.

To address these limitations, financial accounts can be complemented with supervisory data from banks and NBFIs. Generally, supervisory data from banks are more comprehensive than supervisory data from NBFIs. Bank supervisory data typically include variables beyond exposures that help quantify the relationships and risks between banks and NBFIs, such as the aggregate probability of default or the total value of collateral received for loans. Additionally, these data are sometimes available in a granular format (ie at the loan level), allowing for a detailed assessment of banks' exposures and risks to NBFIs. Examples of granular supervisory data include public credit registers maintained in several jurisdictions, the US Call

[26] See E Franceschi, C Kaufmann and F Lenoci, "Non-bank financial intermediaries as providers of funding to euro area banks", *European Central Bank Financial Stability Review*, May 2024, www.ecb.europa.eu/press/financial-stability-publications/fsr/focus/2024/html/ecb.fsrbox202405_04~738c9b3431.en.html.

[27] Euro area credit register and securities holdings data show that a large part of euro area banks' aggregate asset-side exposure to NBFIs is ultimately exposure to banking groups via specialised NBFI subsidiaries such as securities firms and conduits issuing long-term bank bonds. See E Franceschi et al, "Key linkages between banks and the non-bank financial sector", *European Central Bank Financial Stability Review*, May 2023, www.ecb.europa.eu/press/financial-stability-publications/fsr/special/html/ecb.fsrart202305_02~1ff06bc324.en.html.

Reports,[28] Federal Reserve Y-14Q schedules,[29] and the detailed derivatives and securities financing transactions information databases implemented globally following G20 reforms. Regular supervisory data may also be supplemented with more targeted data requests, such as those made in stress testing exercises (eg the European Banking Authority's stress testing data in the European Union).[30]

5.2 Data gaps

Granular exposure data (ie at the counterparty level) are necessary for authorities to monitor interconnectedness. Such data would need to include the characteristics of exposures that would allow regulators and supervisors to assess the sensitivity of the exposures to adverse market conditions. While data for mutual funds and MMFs are relatively well monitored, private and alternative investment data remain inadequate and fragmented, making it difficult to assess the riskiness of bank exposures and systemic risk accurately. The potential for multiple layers of leverage employed by funds and their investors introduces further complexity into risk assessments.

Despite the availability of the mentioned data sources, substantial gaps remain, particularly in the private credit market (as noted in the IMF's Global Financial Stability Report published in April 2024). First, regarding interconnectedness and concentration risks, differences in regulatory requirements across sectors or borders may result in excessive exposure to private credit. Second, current reporting requirements are insufficient for a comprehensive assessment of risks in private credit, such as leverage or credit, liquidity and maturity transformation. Third, regarding conduct risk, there is room to enhance disclosure requirements, particularly relating to conflicts of interest. Where appropriate, authorities could consider closing these data gaps by enhancing reporting to further support monitoring.

6. Conclusions

Linkages between banks and NBFIs arise from a wide range of activities and services and reflect a mutual dependence. Banks are exposed to NBFIs, giving rise to a full range of risks including credit, market, liquidity, operational and counterparty risks. NBFIs are also exposed to banks through short-term cash placements, investment in securities issued by banks and trading activities.

Linkages between banks and NBFIs have been likely shaped by the regulatory reforms since the GFC. While the reforms have made the banking system more resilient, differences between bank and NBFI regulations may have incentivised the shift of business activities to the NBFI sector, which is drawing on services provided by banks. As a result, banks may be exposed to risks which are more difficult to monitor and measure due to increased complexity and data gaps. Further regulatory reforms, such as new or revised macroprudential policies for NBFIs, may have implications for bank-NBFI linkages in the future.

Notwithstanding banks' increased resilience since the GFC, their central role as providers of services to NBFIs may make the system as a whole vulnerable to procyclical reactions during market stress. Distress in the NBFI sector may prompt banks to reduce their risk via margin calls, loan cutbacks and asset sales. While such actions reduce banks' risk and regulatory metrics in the short term, they may amplify shocks and transmit them across the financial system (Scenario 1). Tight interconnections between banks and NBFIs may also lead to spillovers between these sectors when banks depend on NBFIs for risk

[28] The US Call Reports include the amount of loans to "non-depository financial institutions" in its own separate line item.

[29] These reports, collected on a quarterly basis, include, among other data, a bank's CCR exposures to individual counterparties under the stress test scenario developed by the Federal Reserve.

[30] See Box 1 in this report for an illustration of the use of data on bank-NBFI linkages gathered in the context of the EU-wide stress test.

management and risk transfer purposes (Scenario 3) or for funding (Scenario 4) or when they own NBFI entities (Scenario 2).

Granular, timely, high-frequency data are essential to understand and monitor bank-NBFI linkages, but supervisors may not have access to the data they would need to comprehensively map these linkages. Potential improvements for supervisory data include increasing granularity and frequency.[31] Even if individual supervisors have sufficient data to assess such linkages in their jurisdiction, they may face difficulties in assessing risks due to the global scope of bank-NBFI interconnections.

[31] For example, more detailed data on the liability side of banks and on the types of assets used as collateral, as well as high-frequency deposit flow data (stress test data are typically collected annually in the United States and biennially in the European Union for large institutions).

Annex – List of relevant case studies

Activities/links	Link between banks and NBFIs	Risk type	Case studies
Credit: government bonds	Banks' role as market-makers and providers of liquidity to investors	Market-maker/liquidity provider Repo counterparty/margin calls	UK LDI; LTCM
Credit/liquidity: revolving credit facilities	Banks as providers of revolving credit facilities	Liquidity provider	Dash for cash; March 2022 energy markets
Credit: lending to NBFIs	Banks as lenders to non-bank lenders	Credit risk	Finance companies (India/New Zealand); CRE funds
Funding: deposit-taking and repos with NBFIs	NBFIs placing excess liquidity with banks	Liquidity risk	MMFs; Lehman Brothers
Funding: buying bank debt	NBFIs as buyers of bank debt	Cost of funding	MMFs; MREL in the euro area
Asset protection	NBFIs as sellers of protection to banks	Counterparty credit risk/credit risk	AIG
Trading	Banks as counterparties to complex one-way bets	Counterparty credit risk/margin calls	Archegos
Operational: non-financial and mis-selling risks	Banks selling financial products of NBFIs to own customers	Consumer protection/legal risk	Eurovita
Ownership of NBFIs	Banks owning distressed NBFIs – contagion to own funding/equity	Cost of funding	H2O