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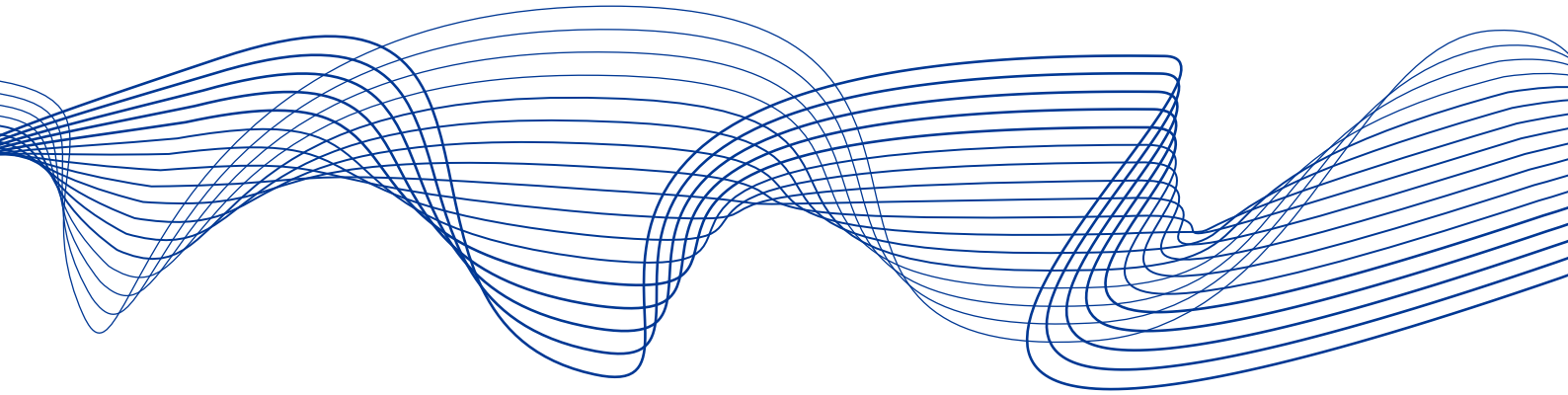
Financial stability risks from linkages between banks and the non-bank financial intermediation sector

February 2026



ECB/ESRB workstream on financial stability risks from bank-NBFI linkages

Contents

Executive summary

Linkages between banks and non-bank financial intermediation (NBFI) entities need to be better understood by authorities responsible for safeguarding financial stability. Vulnerabilities related to leverage and liquidity in the NBFI sector have long been flagged as a financial stability concern. This report has been prepared jointly by the ESRB and the ECB with the aim of providing a better understanding of the financial stability implications of linkages between banks and NBFI entities in the EU, and the euro area in particular. It focuses on the implications of banks' role in managing the liquidity and leverage of the NBFI sector.[1]

European banks play three important and interwoven roles in interaction with the NBFI sector which could give rise to systemic risk spillovers and amplify shocks. The Basel Committee has identified several activities which result in linkages between banks and NBFI entities.[2] First, they rely on banks for liquidity management (see **Chapter 2**). Second, they use banks to provide leverage, helping them enhance their exposures to financial markets and their investments in tangible assets (see **Chapter 3**). Third, banks act as market-makers, enabling other market participants to take synthetic positions and manage financial risks (see **Chapter 4**). In the United States, where the NBFI sector has expanded more and gained a higher share in lending to the real economy than in Europe, banks have been front and centre in providing leverage via loans and liquidity insurance via credit lines to NBFI entities. These activities expose banks to credit, funding and contingent liquidity risks, despite the fact the risks have apparently moved to the NBFI sector.[3] This report provides detail evidence on such linkages in the EU.

Interactions between EU banks and NBFI entities are taking place at a global level. Many of the interconnections between European banks and NBFI entities are with non-EU-based entities and involve transactions denominated in non-EU currencies (see **Sections 2.2**, **2.3**, **3.1**, **3.2** and **Box 2**). Such linkages can expose EU banks to spillovers from global markets, particularly the United States, where a small group of EU banks intermediates between US-based NBFI entities and hedge funds.

The fact that euro are banks are aggregate net debtors to the NBFI sector suggests the key consequence of bank-NBFI linkages in Europe are funding and liquidity vulnerabilities. NBFI entities fund about 15% of bank balance sheets in the euro area, with short-term funding accounting for a large part of this. By comparison, total asset-side linkages to NBFI entities amount to about 10% of total bank assets in the euro area. Only a fraction of this exposure represents

1 NBFI entities are understood to be all financial sector entities other than banks in line with the sectoral definitions used for national accounts.

2 See BCBS (2025). This report focuses on selected activities identified in the BCBS paper: provision of leverage by banks to NBFI entities, funding from NBFI entities to banks and market-making activities. It does not discuss the role of NBFI entities as providers of credit protection to banks via guarantees, credit derivatives and synthetic securitisations. It also does not fully discuss the role of bank-NBFI linkages within financial conglomerates.

3 See Acharya, Cetorelli and Tuckman (2024).

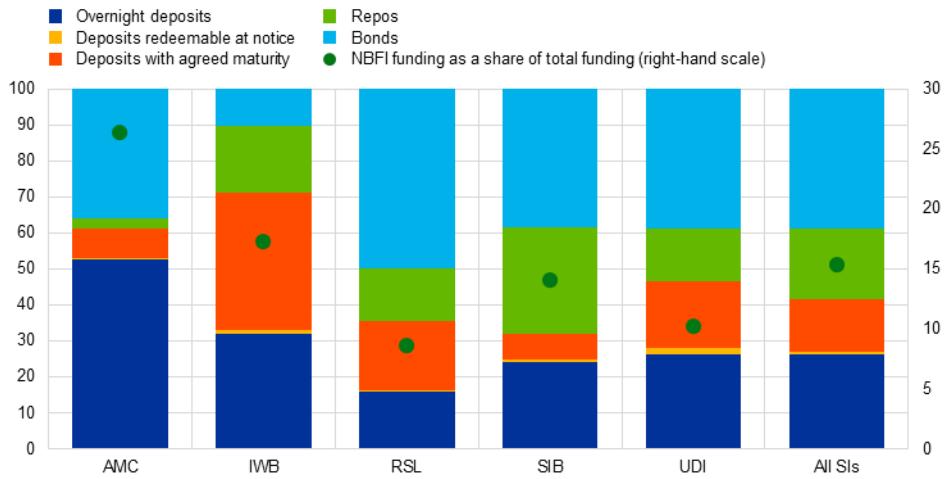
interconnections with potentially leveraged entities. This contrasts with the position of US banks, which are net lenders to the NBFI sector and provide substantial credit lines to enable entities to manage their liquidity risk.

Chart 1

The liquidity management needs of NBFI entities create short-term and volatile bank liabilities

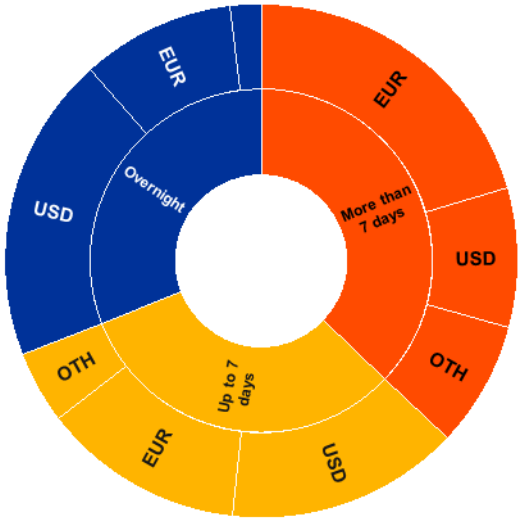
a) Euro area banks' funding from NBFI entities

(Q2 2025, percentages)



b) Euro area banks' repo borrowing from NBFI entities, by currency and maturity

(Q3 2025, percentage shares)



Sources: ECB (supervisory data, SFTDS, SHS) and ECB calculations.
Notes: Panel a): Data cover significant institutions in the euro area. Banks are aggregated using the business model classification developed by ECB Banking Supervision. AMC stands for asset managers and custodian banks, IWB stands for investment and wholesale banks, RSL stands for retail banks and small lenders, SIB stands for global systemically important banks, UDI stands for universal and diversified institutions. Asset managers and custodian banks operate specialised business models by investing on behalf of their clients or safeguarding their financial assets. See ECB (2021). Bonds includes commercial paper and certificates of deposits. Panel b): OTH includes al currencies other than the euro and the US dollar.

Loss of funding from NBFI entities could create challenges for banks in periods of market tension due to the short-term nature of such funding, the homogeneity of NBFI funding providers and limited substitutability:

- **Liquidity management by NBFI entities is creating liquidity vulnerabilities in the euro area banking system (see Sections 2.1 to 2.3).** A large share of NBFI funding to banks has a very short contractual maturity. It can be divided into several sources: deposits, unsecured and secured short-term debt securities, and securities financing transactions (**Chart 1**, panel a), each with varying degrees of funding stability. Funding is provided mainly in euro and US dollars (**Chart 1**, panel b, and **Box 2**). In addition, a substantial portion is raised via long-term debt securities held by NBFI investors, including those with a long-term investment mandate and stable long-term liabilities such as insurers and pension funds, but also mutual funds, which typically provide daily redemptions.

- **NBFI entities' investments in long-term bank debt are key to helping banks meet regulatory requirements for stable funding and loss-absorption capacity, but their presence could amplify the vulnerabilities of weaker banks.** EU insurers and pension funds are stable long-term investors in bank debt, with diversified portfolios and a preference for investment-grade bonds in their local currencies (see **Section 2.4**). These preferences may lead to cliff-edge effects, as a scenario in which a bank loses its investment-grade rating may result in fire sales of long-term debt by the NBFI sector and loss of market access for the bank. The impaired ability to roll over long-term debt would translate only slowly into regulatory constraints, as banks usually space out the maturities of the debt they issue. These investments also expose NBFI entities to spillovers from the banking sector when banks' credit quality deteriorates.

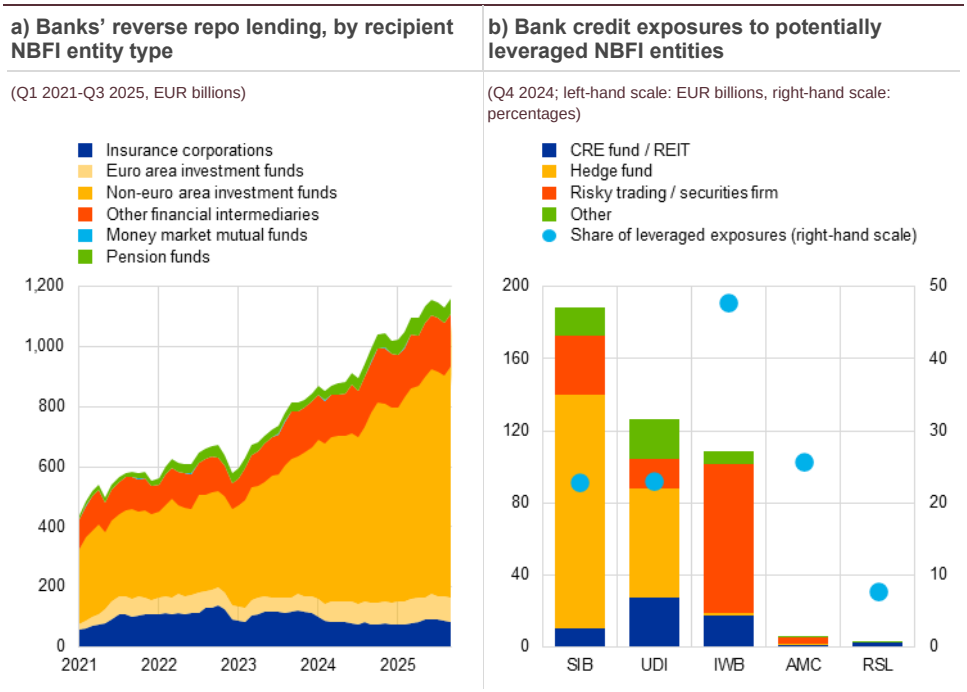
- **Idiosyncratic risks to financial stability from a shock to a single large NBFI funding provider are contained,** as most banks diversify their sources of funding. Nevertheless, a significant portion flows to large, specialised banks.

- **A negative and systemic price shock in asset markets might result in redemption requests and margin calls to multiple groups of NBFI entities at once.** These in turn could recall their liquidity held with euro area banks to meet outflows and redemptions, leading to a broad-based decline in NBFI funding. This may result in the liquidity in short-term bank debt securities markets and repo markets drying up, as NBFI entities that typically lend to banks via these markets would need to meet their own liquidity needs.

- **Because NBFI entities may proactively increase their cash positions in periods of high uncertainty, their deposits with banks may increase, partly mitigating funding shocks (see Box 1).** Nonetheless, net mitigating effects may be limited, as they tend to place deposits with other banks than those using repo and short-term debt securities funding.

Chart 2

Bank credit exposures to NBFI entities using leverage for trading purposes and to invest in long-term illiquid assets are limited, but growing



Sources: ECB (supervisory data, AnaCredit, SFTDS) and ECB calculations.
Notes: Panel a): Median values over the course of a month, computed from daily SFTDS data on outstanding positions. "Other financial intermediaries" comprises other financial institutions, captive financial institutions and financial auxiliaries. Reverse repo lending to money market funds is very small, below €1 billion, and therefore may not be visible on the chart. Panel b): CRE stands for commercial real estate, REIT stands for real estate investment trusts. Banks are aggregated using the business model classification developed by ECB Banking Supervision. AMC stands for asset managers and custodian banks, IWB stands for investment and wholesale banks, RSL stands for retail banks and small lenders, SIB stands for global systemically important banks, UDI stands for universal and diversified institutions. Asset managers and custodian banks operate specialised business models by investing on behalf of their clients or safeguarding their financial assets. See ECB (2021). Identification of potentially leveraged NBFI entities based on business models. Data include exposures to bank-owned NBFI entities but exclude intragroup exposures. See Section 3.1 for details.

Lending to NBFI entities which use leverage indirectly exposes banks to the outcomes of their trading strategies, with reverse repo lending to hedge funds being the largest source of vulnerability. About a quarter of banks' total credit exposure is to potentially leveraged NBFI entities (see **Section 3.1**). Two sources of vulnerability arise from these exposures, mirroring two types of trading strategies:

- **Severe asset price shocks may lead to a substantial increase in capital and margin requirements on exposures to hedge funds and securities firms, and trigger abrupt unwinding, possibly resulting in asset fire sales and credit losses for banks.** The larger group of potentially leveraged NBFI entities uses leverage for short-term trading and borrows from banks via repo transactions, often denominated in US dollars. The scale of reverse repo lending to NBFI entities has more than doubled over the last four years (**Chart 2**, panel a). North American hedge funds domiciled in the Cayman Islands and broker-dealers are the main counterparty groups. These reverse repo transactions are collateralised, usually by government bonds, mitigating the immediate credit and market risk. While the available data do not allow for a conclusive assessment of the amount of leverage applied, reverse repo lending

to hedge funds likely underpins trading strategies that build on using it, such as relative value arbitrage.

- **Exposures to potentially leveraged NBFI entities which invest in illiquid long-term assets using term loans and credit lines could be vulnerable to shocks to those assets, leading to credit losses for the banks.** This group of NBFI entities includes commercial and other real estate funds, as well as non-bank lenders that provide loans and leasing services to the real economy. They use bank loans to enhance returns on their long-term investments in real estate or originate non-bank credit. Lending to these NBFI entities appears small compared with the size of reverse repo lending to hedge funds (**Chart 2**, panel b).[4] As leverage at commercial and other real estate funds is usually lower than that of hedge funds, and bank lending is collateralised,[5] credit risk tends to be limited. Given the illiquid and long-term nature of the assets held by these NBFI entities, however, some credit losses cannot be ruled out if property prices fall.

A large share of headline total bank credit exposure to NBFI entities is related either to intragroup transactions or to transactions with NBFI entities owned by competing banking groups. Other financial intermediaries (OFIs) connected to banking groups are mainly prime brokers, securities firms, securitisation vehicles, leasing operations and financing conduits. Intragroup structures can help optimise liquidity needs between parent and affiliated institutions and provide long-term benefits in terms of revenue and risk diversification. However, they also expose banks to spillovers and potential step-in risks, in terms of both solvency and liquidity, and may obscure the risk profile of the banking sector.[6]

Banks' activity in the repo market reflects their role as intermediaries, as they use it to source only a limited amount of their net funding from NBFI entities. However, banks lend to and borrow from different groups of counterparties. For instance, they borrow euro from euro area money market funds and pension funds and lend them on to euro area insurers (**Chart 3**, panel a). In the US dollar repo market, banks intermediate between two groups of investment funds: they borrow mainly from US-based money market funds and lend to hedge funds (**Chart 3**, panel b). Given the diverse composition of NBFI sectors, counterparties, maturity structures and currency profiles, these exposures are not without risks for euro area banks. The dynamics may give rise to liquidity and counterparty credit risk, as most repo trading between banks and NBFI entities is not centrally cleared.[7]

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4 While this group includes some exposures to private equity and private credit funds, the limitations of the data available are such that it is not possible to identify or quantify these exposures accurately.

5 See Section 2.4 in ESRB (2025).

6 A large proportion of major EU asset managers are owned by banking groups. See Section 2.1 in ESRB (2024).

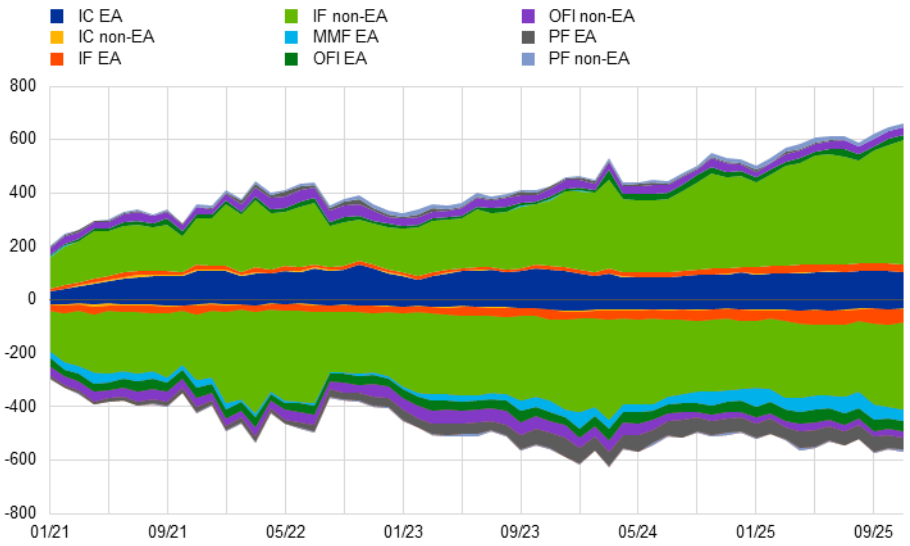
7 The share of centrally cleared repos is close to 41% for euro-denominated transactions and 4% for dollar-denominated transactions. These shares are lower if only transactions between banks and NBFI entities are included. See Hermes, Schmeling and Schrimpf (2025).

Chart 3

Euro area banks as intermediaries in the repo market

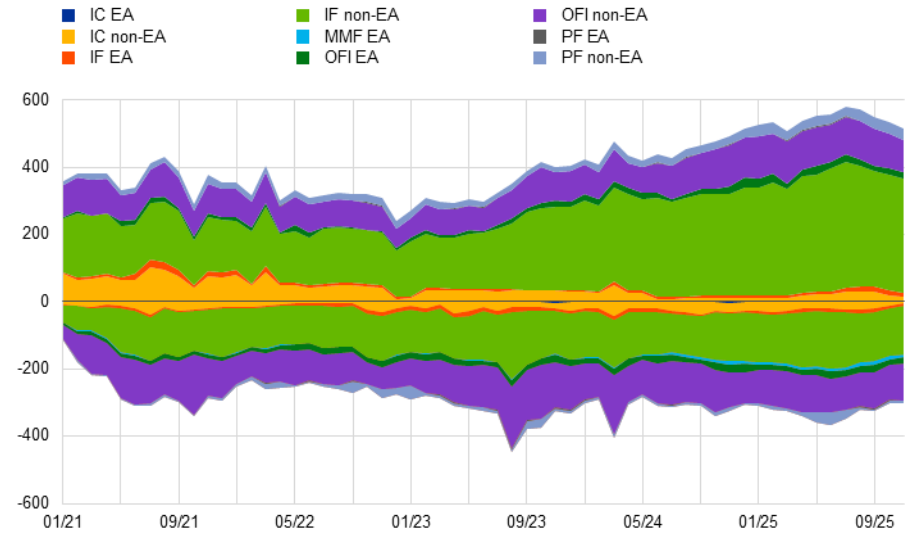
a) Euro area banks' reverse repo lending and repo borrowing denominated in euro with global NBFI entities

(Jan. 2021-Nov. 2025, EUR billions)



b) Euro area banks' reverse repo lending and repo borrowing denominated in dollars with global NBFI entities

(Jan. 2021-Nov. 2025, EUR billions)



Sources: ECB (SFTDS), sector enrichment based on Lenoci and Letizia (2021), and ECB calculations.
Note: Repo and reverse repo positions are calculated as medians within the month. OFI stands for other financial intermediaries, IF stands for investment funds, IC stands for insurance corporations, PF stands for pension funds, MMF stands for money market funds. Non-euro area money market funds are reported together with other non-euro area investment funds.

In comparison with lending to NBFI entities, euro area banks' holdings of debt securities issued by them represent a lower risk, as they are heavily concentrated in the senior tranches of securitisation bonds (see **Section 3.2**). These assets include US agency mortgage-backed securities (MBSs) and securitised European bank loans, and usually incur limited credit risk. A sizeable portion is denominated in US dollars.

Derivatives markets may serve as a spillover channel, as banks and NBFI entities are exposed to counterparty credit risk and margin calls. In derivatives markets, NBFI entities interact with banks to hedge financial risks and take positions in financial assets. Euro area global systemically important banks (G-SIBs)[8] are central to the functioning of these markets. Banks hedge interest rate risks in their banking books using derivatives, with NBFI entities on the opposite side of the trades. The banks also provide US dollars to entities via derivatives for hedging and to facilitate exposure to US assets. In the cross-currency interest rate swap (IRS) and foreign exchange (FX) markets, banks act as intermediaries in derivatives trading, providing dollars and maintaining matched books in other major currencies. For other derivatives asset classes, banks mostly provide access to clearing services and make markets in derivatives traded over the counter (see **Chapter 4**). These activities, while not leading to large direct exposures to asset price movements, expose banks nonetheless to counterparty credit risk which may amplify financial losses during stress.[9]

Euro area G-SIBs stand at the epicentre of bank-NBFI linkages in Europe, owing to their major footprint in financial intermediation. Their market share in key fields where banks and NBFI entities are interconnected significantly exceeds their share in the euro area banking sector as a whole (**Chart 4**, panel a). Exposures are usually well diversified, mitigating idiosyncratic risk from possible failures by individual counterparties, but creating a substitutability problem for NBFI entities. G-SIBs play a key role as intermediaries of funds between different parts of the NBFI sector. In the repo market they borrow from money market funds in the United Sates and provide leverage to hedge funds abroad.[10] In the interest rate derivatives markets, they intermediate between insurers and pension funds (which need exposure to long-term duration risk) and banks (which aim to hedge the risk arising from mortgage lending). Similarly, G-SIBs are among the key providers of foreign exchange risk hedging to NBFI entities. In general, across all derivative asset classes G-SIBs facilitate intermediation of over half of gross notional value (**Chart 4**, panel b). In the repo market and some parts of derivatives markets, NBFI entities have few European alternatives to euro area G-SIBs.

8 G-SIBs are euro area banks included in the Financial Stability Board's classification of global systemically important banks, which correspond to euro area global systemically important institutions (G-SIIs). UniCredit S.p.A., which was a G-SIB until the end of 2023, is included as part of this group due to its similarity in business operations with NBFI entities, aligning with the characteristics of other G-SIBs.

9 See Barbieri et al. (2025) and ECB (2025).

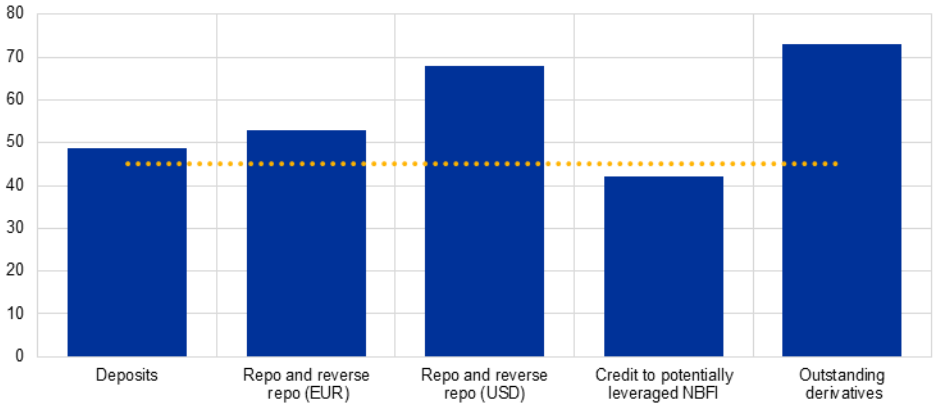
10 See Klaus and Mingarelli (2024).

Chart 4

Euro area G-SIBs take centre stage in financial intermediation with NBFI entities

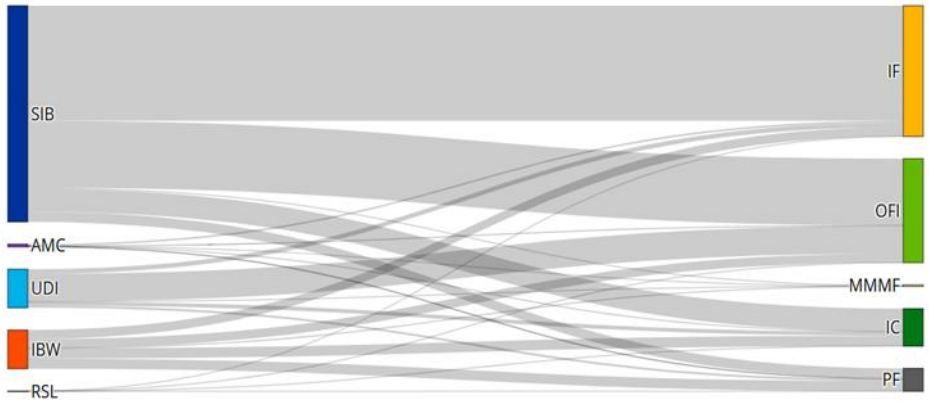
a) Share of euro area G-SIBs in bank linkages with NBFI entities

(Q2 2025, percentages)



b) Outstanding gross notional derivatives exposures of SIs with NBFI entities, by bank business model and NBFI subsector

(Q3 2025, share of total gross notional value)



Sources: ECB (supervisory data, AnaCredit, SFTDS, EMIR), EMIR sector enrichment based on Lenoci and Letizia (2021), and ECB calculations.
Notes: Panel a): The dotted line represents the share of euro area G-SIBs in total assets of significant institutions. Panel b): Notional outstanding is a crude measure of derivatives activity but is not representative of risk exposures. OFI stands for other financial intermediaries, IF stands for investment funds, IC stands for insurance corporations, PF stands for pension funds, MMF stands for money market funds, AMC stands for asset managers and custodian banks, IBW stands for investment and wholesale banks, RSL stands for retail banks and small lenders, SIB stands for global systemically important banks, UDI stands for universal and diversified institutions.

The structure of bank-NBFI linkages and the associated financial stability risks highlight the need for sufficient risk-bearing capacity among euro area G-SIBs. During financial stress, banks may pull back from providing leverage to NBFI entities or increase margin requirements, either to protect their own balance sheets or to raise the cash needed to meet outflows of short-term repo funding. In turn, such reactions could force NBFI counterparties to liquidate positions, amplifying adverse market movements. Capital headroom – in terms of both leverage and risk-weighted requirements – and liquidity buffers held by the banking sector would reduce the need for procyclical actions. These measures allow banks to maintain smooth provision of liquidity, leverage and financial services to the NBFI sector during episodes of financial stress. In this way, risk-bearing capacity enables banks to play

the role of shock absorbers in the financial system and avoid amplifying financial stress.

Granular analysis is essential to understanding bank-NBFI linkages, but is constrained by data gaps and fragmented data access (see Chapter 5). The limited availability of data on balance sheets and the financial risk of NBFI entities such as hedge funds, private equity and private credit funds is a key gap hindering assessment of the riskiness of bank exposures. Some granular data on NBFI holdings and transactions in financial assets are collected, but these face geographic limitations and identification challenges. Notably, data on exposures outside the EU and transactions taking place outside the EU are largely missing, reducing the visibility of risks to EU banking groups. The sectoral focus of authorities collecting NBFI data and banking data makes it hard to join up granular data. Better information sharing, with a centralised mechanism for data access and sharing, could remedy some of these constraints. Even so, major gaps as regards the interlinkages between banks and non-EU NBFI entities are likely to remain.

1 Introduction

Linkages between banks and NBFI entities have been identified by European policymakers as a potential concern for financial stability. NBFI entities encompass a diverse and heterogenous set of entities, spanning open- and closed-ended investment funds, insurance corporations, pension funds and other financial intermediaries.[11] Following a period of rapid growth in the EU and worldwide after the global financial crisis, in terms of financial assets at the EU level the sector now outranks the banking sector, which has deleveraged and retrenched. As the sectors are interconnected, the European Central Bank (ECB), the European Systemic Risk Board (ESRB), and many national central banks and prudential authorities have noted that shocks may spread between the banking and NBFI sectors, and that such interconnections may amplify shocks originating from one of them.

The growth of the NBFI sector has been facilitated by the banking sector, which is connected with a wide range of NBFI entities. Banks are an essential element in the financial system. They provide key services, such as lending, deposit-taking, payment, clearing, settlement and custody services, as well as market-making. NBFI entities rely on these services to invest in assets and manage risks, resulting in financial linkages for various economic purposes with banks.

Linkages between banks and NBFI entities have also been augmented by evolving financial regulations and structural changes. On the banking side, post-crisis regulatory reforms have increased the need for long-term stable funding and the ability to issue loss-absorbing liabilities. These instruments are often held by professional investors, such as NBFI entities. Reforms to money and derivatives markets have led to an increased role for central clearing, making bank-NBFI linkages in repo and derivatives markets safer and more resilient to shocks. The financial sector has also evolved towards increased automation of trading and a broker-based market-making model, reducing the role of dealer banks.

This report investigates bank-NBFI linkages in the EU, with a particular focus on the funding raised by banks from NBFI entities and bank credit exposures to them. Previous work by the ECB and the Basel Committee has identified four main channels through which shocks may spill over between banks and NBFI entities: provision of leverage by banks to NBFI entities, use of NBFI funding by banks, ownership of NBFI entities by banking groups and risk transfers from banks to NBFI entities.[12] Further channels could involve common exposures to asset markets and reliance on critical services provided by NBFI entities. Of these channels, provision of leverage by banks to NBFI entities and funding of banks by them have been assessed as the most powerful in terms of possible impact on financial stability. Concentration of bank-NBFI linkages in EU G-SIBs and investment

[11] Unless otherwise specified in this report, the analysis differentiates between money market funds (MMFs) and other investment funds to reflect the specificities of their business models. Additionally, the category “other financial intermediaries” encompasses financial vehicles as well as captive financial institutions.

[12] See BCBS (2025).

banks, and in specific activities such as bank funding, could create financial stability concerns.

The key novel contribution of this report is the extensive use of granular, firm-to-firm and transaction-level data on interactions between banks and NBFI entities. Granular data collection started after the global financial crisis in order to provide authorities with timely information on emerging financial stability risks. Analysis has been made possible by merging data reported in several granular databases: supervisory banking data, credit registers (AnaCredit), securities holdings statistics (SHS), securities financing transactions data (SFTDS) and derivatives data (EMIR). These datasets have been complemented with several official registries of regulated entities (ECB RIAD for banks, lists of supervised entities for insurers, pension funds, money market mutual funds and other investment funds) as well as lists of NBFI entities sourced from commercial data providers (e.g. for private equity and private credit funds). Due to data availability constraints[13] and the need to study granular data on linkages between individual banks and NBFI entities, the report builds on euro area data, complemented by contributions on individual EU Member States.[14]

Chapter 2 of the report identifies and assesses bank funding from NBFI entities. It investigates the systemic liquidity risk associated with banks' reliance on NBFI funding. The analysis considers the magnitude, volatility and substitutability of NBFI funding to banks, with a particular focus on short-term funding instruments such as deposits, repos and commercial paper. It draws on granular datasets such as Money Market Statistical Reporting (MMSR) and the SFTDS, combined with supervisory reporting for banks and, where available, for NBFI entities. As granular data on other sources of bank funding from NBFI entities are generally not available, the analysis remains at the sectoral level. **Box 1** in the Annex complements Chapter 2 with an analysis of the behaviour of investment fund deposits under stress at banks in Luxembourg. **Box 2** reviews US dollar funding of Nordic banks by NBFI entities.

Chapter 3 assesses banks' credit exposures to NBFI entities. It aims to identify exposures to entities which engage in maturity and liquidity transformation, and how concentrated these are on both the lender and borrower sides, using granular data (e.g. AnaCredit, SFTDS and SHS). We assess the risks arising from off-balance-sheet exposures to these entities, such as those related to the provision of contingent credit facilities, and derivatives transactions. The work does not cover all transmission channels between NBFI entities and banks, in particular those resulting from the role of NBFI entities as providers of credit insurance and investors in

13 In particular, data collected under the AIFM Directive and the UCITS Directive could not have been used as the organisations represented in the workstream do not have access to these data at the euro area or EU level.

14 The report does not cover network analysis and stress testing. While such techniques could provide insights into how bank-NBFI linkages would change during financial stress, their development and implementation would require resources and expertise which are not available to the workstream, System-wide stress test models were part of the mandate of the Financial Stability Committee's Working Group on Stress Testing (WGST); see Budnik et al. (2024) for an overview of the WGST's work.

securitisations sponsored by banks,[15] those resulting from bank investment in equity instruments issued by NBFI entities (i.e. ownership structures)[16] and those of portfolio asset commonality.[17]

Recent literature has focused on the United States, highlighting the growing role of banks as lenders to NBFI entities. Although interlinkages between the two are significant on both sides of the Atlantic, the nature of these exposures and their underlying purposes result in differing net positions. In the United States, banks tend to be net lenders to the NBFI sector, whereas in the euro area they are typically net borrowers from it. Drawing on bank finance, often provided as senior first-lien loans or repo transactions, US NBFI entities in turn lend to real economy borrowers through private credit activities, NBFI mortgage and consumer lending, and investments in corporate and mortgage debt securities. These developments change the role of banks in the financial system and may add to complexity and reduce transparency. Despite the appearance of risks having moved to the NBFI sector, interconnections expose US banks to credit, funding and contingent liquidity risk.[18] This report reviews whether similar developments can be observed in the EU.

This report has been prepared by a workstream of the Eurosystem's Financial Stability Committee (FSC) and the ESRB's Advisory Technical Committee (ATC). The workstream included members from the ECB, the EBA, EIOPA, ESMA and national central banks and supervisory authorities from 12 EU Member States.

15 NBFI entities have been the main investor group in synthetic securitisations, which enable banks to retain credit relationships with borrower while transferring credit risk to another party. This market has grown rapidly over the last few years in the euro area. See ESRB (2025c).

16 Such equity investments are usually made to obtain control over the NBFI entity. As a result, the bank participates in the profits and losses earned by the entity and is exposed to the P&L volatility as well as to the step-in risk (i.e. the risk that it may provide capital support to its NBFI affiliate in financial difficulties). See Section 2.1 in ESRB (2024a).

17 A recent analysis showed limited indirect linkages through common securities portfolios between euro area banks and NBFI entities. See Section 3 in Franceschi et al. (2023).

18 See Acharya, Cetorelli and Tuckman (2024).

2 Bank funding from NBFI entities

Approximately 15% of euro area banks' balance sheets are funded by NBFI entities. They mainly provide this funding through deposits, repo lending and by buying bank debt securities in the primary market. This chapter provides a descriptive analysis on the scale of euro area bank funding received from NBFI entities. Its focus lies on the types of instrument and the currency and maturity profiles of the funding. Findings show that banks' reliance on NBFI funding differs significantly across business models and that funding from NBFI subsectors varies across instrument types, depending on NBFI activities. Bank funding from NBFI entities is also concentrated from both the borrowers' and lenders' perspective. Reliance on short-term or market-based instruments might expose banks to liquidity and credit risks via two channels.

Funding from NBFI entities tends to be short-term and concentrated, exposing banks to roll-over and redemption risk if funding is suddenly withdrawn. Sections 2.1 to 2.3 provide a descriptive analysis of euro area banks' reliance on short-term funding from NBFI entities, focusing on deposits, repos and short-term debt securities.[19] The concentration of bank funding from NBFI entities goes along several dimensions. Within the euro area as a whole, both borrowers (banks) and lenders (NBFI entities) are highly concentrated, albeit to slightly different degrees. Given their large banking sectors, France and Germany receive a significant share of funding from NBFI entities compared with other euro area countries.

NBFI holdings of long-term debt instruments could expose banks to refinancing risk. A massive liquidation of bank bonds by NBFI entities might affect banks' future funding cost and CDS premia. Section 2.4 looks at NBFI holdings of debt securities issued by banks, focusing on insurance corporations, and then breaks down NBFI holdings of bank debt securities by maturity, currency and bond type. An assessment of the financial stability implications of these relationships concludes the chapter.

[19] Liabilities-side exposures are often not available at sufficiently granular, entity-level detail, which complicates the identification of funding sourced from NBFI entities within the same banking group. Where feasible, we exclude intragroup transactions, as in the case of repo data derived from the SFTDS dataset. Discrepancies in reported shares may arise due to differences in data sources. In some instances, we utilise funding data from ECB supervisory sources, which provide broader bank coverage and a consolidated perspective on a banking group, but are less frequent and lack the granularity to distinguish between NBFI subsectors. In others, we rely on monthly individual BSI data, which differentiate between OFIs, IFs and ICPFs but have a narrower coverage in terms of significant institutions and are reported at a legal entity level. The SFTDS dataset also offers daily insights into repo funding, with a more detailed breakdown across NBFI subsectors due to its granular structure.

2.1 Bank deposits from NBFI entities

The overall share of bank deposits from NBFI entities has declined slightly over time and amounts to around 12% of the total (**Chart 2.1**, panel a). Consolidated data eliminating intragroup linkages and capturing deposits booked in subsidiaries and branches outside the euro area put total deposits held by NBFI entities at euro area significant institutions at €1.8 trillion as of June 2025, representing 12.9% of total deposits and 6.7% of total liabilities and equity. A more granular data source available at the ECB allows to distinguish by NBFI sector and deposit maturity. This reveals that investment funds and other financial intermediaries (OFIs) collectively account for the majority of deposits held by NBFI entities at euro area banks.[20] The OFI sector encompasses a wide range of entities interconnected with banks in different ways and to varying degrees. They include financial corporations engaged in lending, investment firms and special-purpose vehicles, particularly those involved in bank loan securitisation (i.e. financial vehicle corporations (FVCs)). When assessing OFIs it is important to bear in mind that a large portion of their deposits may originate from companies belonging to the same group as the bank where the deposits are held. Furthermore, the deposits held by FVCs, which are substantial in some jurisdictions, are indirectly linked to banks.[21]

[20] For reference, as of June 2025, total deposits by euro area banks reported in individual BSI data amount to approximately €9.3 trillion, compared with €13.5 trillion reported in supervisory data, of which €1.1 trillion from NBFI entities, compared with €1.8 trillion reported in supervisory data. Of the 110 significant institutions reporting funding information in supervisory data, 76 are available in the BSI dataset.

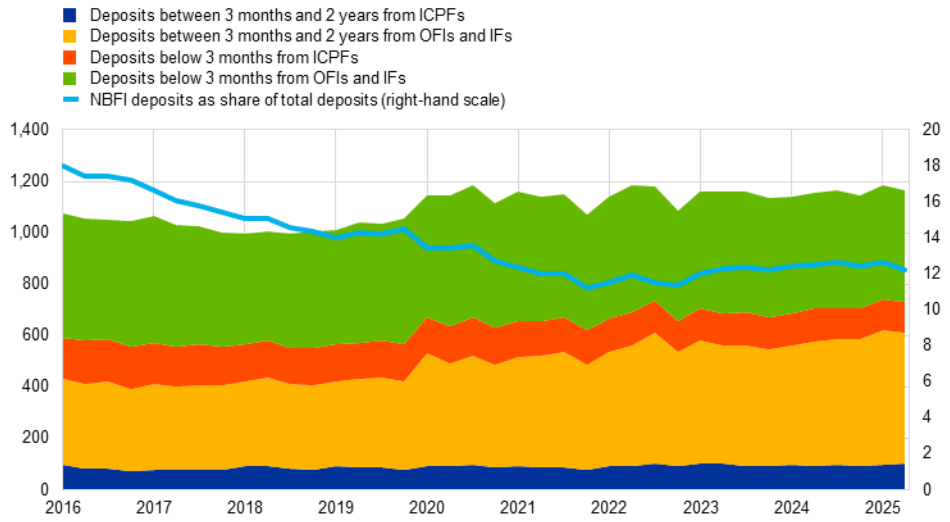
[21] Granular data on deposits is not available for such an extended time series; however, evidence from the assets side suggests that a portion of credit exposures to OFIs is likely attributable to intragroup exposures. Therefore intragroup deposits subject banks to risks that differ from those associated with deposits originating from external entities. In addition, according to the ECB rules for compiling BSI statistics, deposits from FVCs with an agreed maturity over two years conventionally include an item relating to retained securitisation transactions. This is to counterbalance the securities held by banks that are repurchased by the FVCs, which inflates the true size of NBFI deposits with banks.

Chart 2.1

Share of deposits at euro area banks from NBFI entities, by maturity and business model

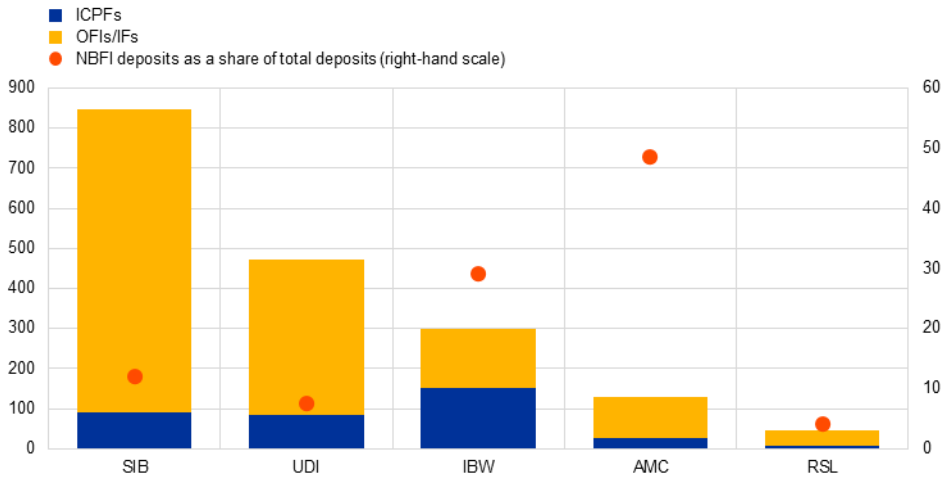
a) Share of deposits at euro area banks from NBFI entities, by sector and maturity

(Q1 2016-Q2 2025; left-hand scale: EUR billions, right-hand scale: percentages)



b) Share of deposits at euro area banks from NBFI entities, by bank business model and NBFI sector

(Q2 2025; left-hand scale: EUR billions, right-hand scale: percentages)



Sources: ECB (BSI, supervisory data) and ECB calculations.
Notes: ICPFs stands for insurance corporations and pension funds, OFIs stands for other financial intermediaries, IFs stands for investment funds. Panel a): Total deposits and deposits from NBFI entities are sourced from the individual BSI dataset and represent roughly 61% of total deposits (from NBFI entities) at euro area banks. Panel b): Aggregate deposit values and overall NBFI share are based on supervisory statistics and include all significant institutions. Deposits include overnight deposits, deposits redeemable at notice and deposits with agreed maturity. The relative shares of the two NBFI sectors are derived from BSI; for some countries the sample of significant institutions differs from that of supervisory data. The relative NBFI sector shares should therefore be interpreted as proxies, even though the approximation will be very precise for most countries – especially the larger ones.

The banks that rely most on deposits from NBFI entities are those with specialised business models. Asset managers and custodian banks, which account for the smallest volume of deposits out of the five predominant bank business models in the euro area, receive 50% of their deposit funding from NBFI entities, followed by investment banks and G-SIBs, with around 30% and 14% respectively. Universal banks and retail banks and small lenders receive less than

10% of their deposits from NBFI entities. While most of deposit funding comes from OFIs and IFs, it seems insurance corporations and pension funds channel this type of funding towards investment banks in particular (**Chart 2.1**, panel b).

Banks located in the countries where many NBFIs are domiciled tend to hold a high share of NBFI deposits. This includes Ireland- and Luxembourg-based subsidiaries of foreign banks offering specialised services to NBFI entities which are also often based in these two jurisdictions. Such services include payment, settlement and custodian services (see Box 1, which discusses investment funds' deposits at banks in Luxembourg in detail). Banks domiciled in Germany and the Netherlands receive a large volume of deposit funding from insurance corporations and pension funds, reflecting the significant size of NBFI entities in these countries and the investment strategies employed to manage large-scale assets effectively (**Chart 2.2**, panel a).

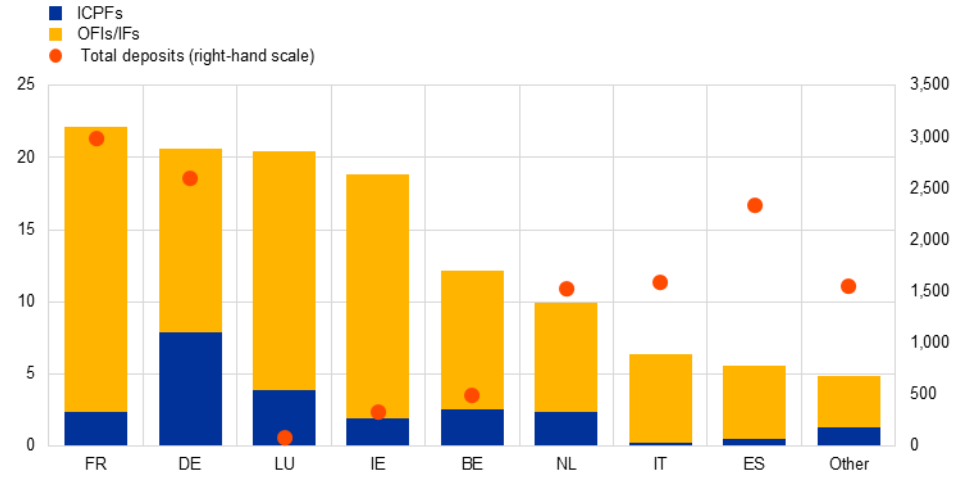
Only a few large banks receive the bulk of deposits from NBFI entities, but these account for comparatively low shares of NBFI funding in overall bank funding. The bank business models with the higher share of NBFI deposit funding are also the ones where this funding is most concentrated from the bank perspective. The top five borrower banks receive more than 70% of NBFI deposit funding within systemically important banks, and asset managers and custodian banks (**Chart 2.2**, panel b).

Chart 2.2

Deposit concentration by bank country and business models

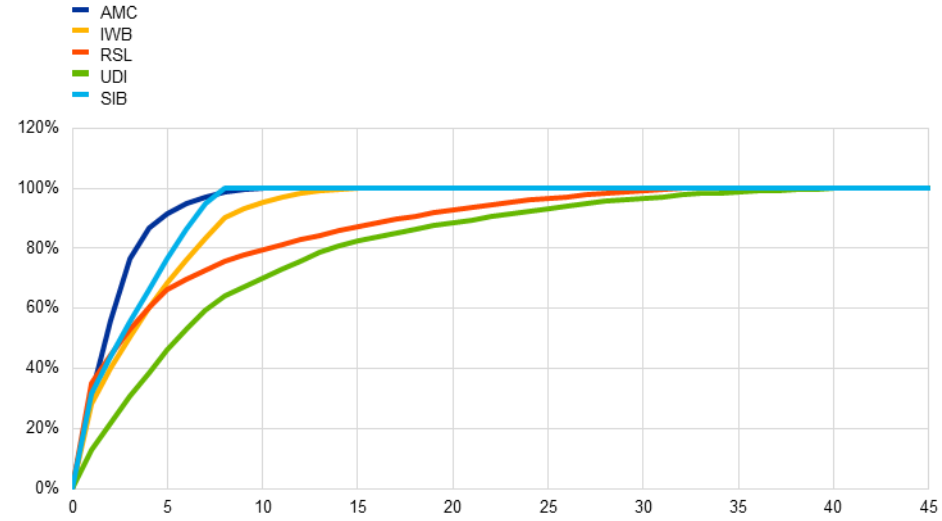
a) Deposits at euro area banks from NBFI entities, by country and NBFI sector

(Q2 2025; left-hand scale: percentages, right-hand scale: EUR billions)



b) Cumulative share of deposits at euro area banks from NBFI entities, by bank

(Q2 2025; x-axis: number of banks, y-axis: cumulative shares)



Sources: ECB (BSI, supervisory data) and ECB calculations.
Notes: Panel a): "Other" refers to the remaining euro area countries not shown in the chart. Aggregate deposit values and overall NBFI share are based on supervisory statistics and include all significant institutions. Deposits include overnight deposits, deposits redeemable at notice, and deposits with agreed maturity. The relative shares of the two non-bank sectors are derived from the individual BSI dataset; for some countries, the sample of significant institutions differs from that of supervisory data. The relative non-bank sector shares should therefore be interpreted as proxies, even though the approximation is expected to be accurate for most countries – especially the larger ones. Panel b): SIB stands for systemically important banks; UDI stands for universal and diversified institutions, which include universal banks and diversified lenders; IWB stands for investment and wholesale banks; AMC stands for asset managers and custodian banks; RSL stands for retail banks and small lenders.

2.2 Banks' repo funding from NBFI entities

Repo funding of euro area significant institutions (SIs) comes largely from investment funds and OFIs, with relative shares stable over time. According to transaction-level SFTR data, NBFI entities worldwide were channelling around €800 billion of repo funding to euro area SIs as of the third quarter of 2025. This type of bank funding doubled between 2021 and 2025, with the largest driver of the increase being investment funds (**Chart 2.3**, panel a). Most of the funding − 73% of the total − comes from NBFI entities outside the euro area. However, these data do not capture repo funding provided by non-resident NBFI entities to foreign subsidiaries of euro area banks, which may be considerable, especially for euro area G-SIBs active in the US market.[22] As most of these liabilities result from intermediation activity, they tend to be matched by corresponding reverse repo lending in the same currency, but to different counterparties.

Most repos are of short duration, exposing banks to roll-over risk. The significant share of repos provided by OFIs and IFs is indicative of the proportion of total financial sector assets held by these types of institutions (**Chart 2.3**, panel b).[23] Measured against their balance sheet size, the share of assets invested in repo lending to banks is particularly high at pension funds and money market funds. Around two-thirds of the repo funding banks get from NBFI entities matures within seven days (**Chart 2.3**, panel c).

[22] See Klaus and Mingarelli (2024).

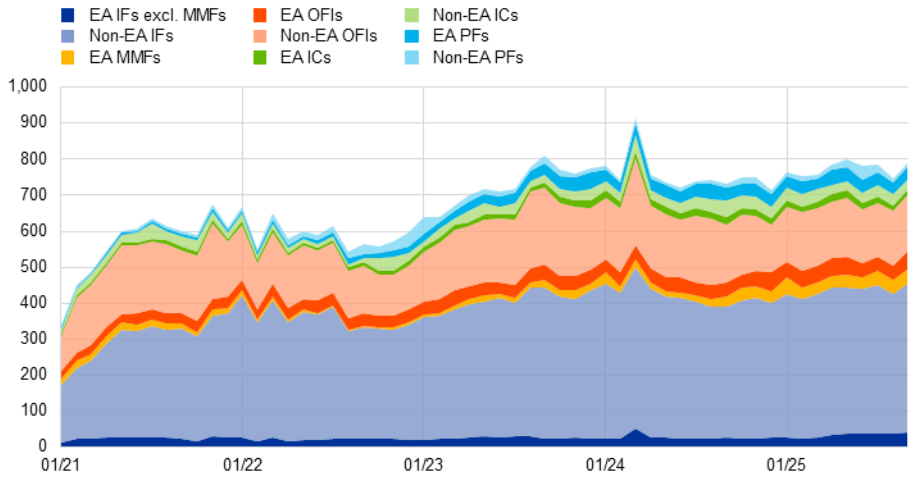
[23] Specifically, IFs and MMFs account for approximately 20% of total financial sector assets, while OFIs and financial vehicles represent around 25%. By contrast, insurance corporations and pension funds hold a comparatively smaller share, at roughly 15%.

Chart 2.3

Repo funding of euro area banks from NBFI entities, by NBFI sector, maturity and over time

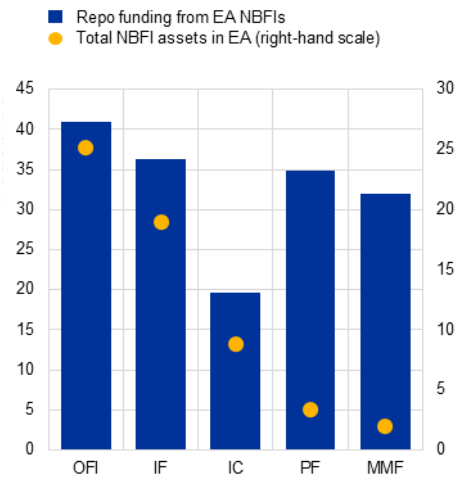
a) Repo funding of euro area banks from NBFI entities, by NBFI sector over time

(Jan. 2021-Sep. 2025, EUR billions)



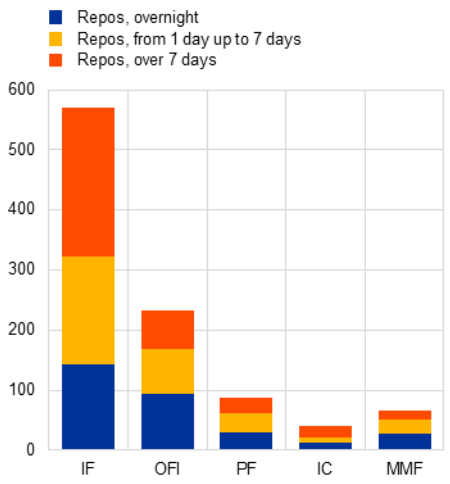
b) Repo funding of euro area banks from euro area NBFI entities, and total NBFI assets

(Q2 2025; left-hand scale: EUR billions, right-hand scale: EUR trillions)



c) Repo funding of euro area banks from NBFI entities, by NBFI sector and maturity

(Sep. 2025, EUR billions)



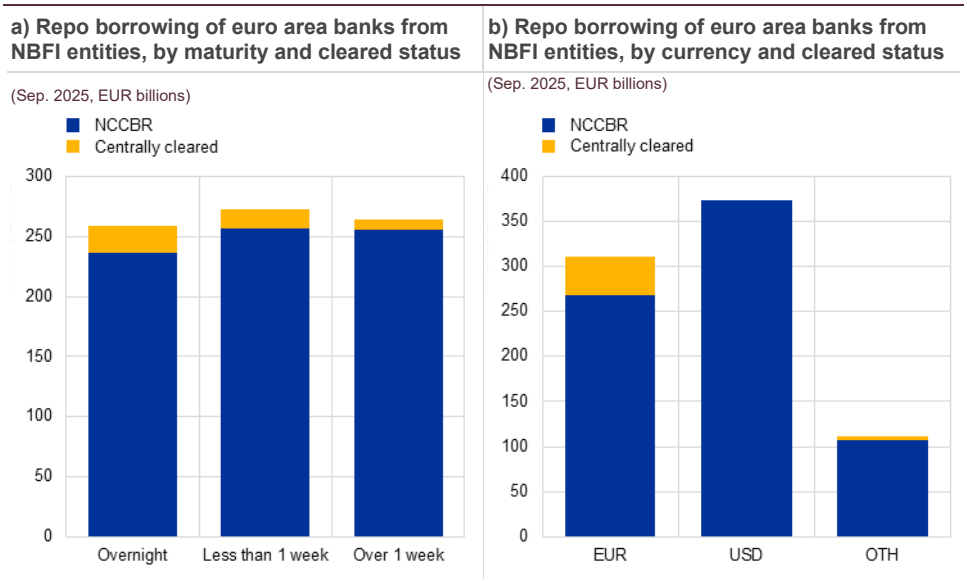
Sources: ECB (SFTDS, supervisory data) and ECB calculations.
Note: Amounts outstanding are computed as the monthly median outstanding position from daily repo data at bank-NBFI level as reported in SFTDS.

Repo funding is concentrated on the funding provider side, as the 112 entities accounting for the top 10% of NBFI lenders to banks constitute the bulk of total NBFI repo funding to euro area SIs. More than 80% of the funding provided by NBFI entities originates from the top decile of NBFI entities. This high level of concentration coincides with a relatively even distribution across NBFI subsectors. The largest non-bank repo funding providers also have significantly more links to euro area banks, which mitigates NBFI concentration risks for euro area SIs (**Chart 2.5**, panel a). These large repo funding providers mainly include securities and

trading subsidiaries of international banks, and large hedge funds. A large majority of repo transactions between banks and NBFI entities are not centrally cleared (**Chart 2.4**), exposing participants to counterparty credit risk should the value of the collateral or credit quality of the counterparty change during the lifetime of the repo.

Chart 2.4

Bilateral and centrally cleared bank repo funding from NBFI entities



Sources: ECB (SFTDS) and ECB calculations.
Notes: NCCBR stands for non-centrally cleared bilateral repo. Outstanding repo positions are computed as median values over the month.

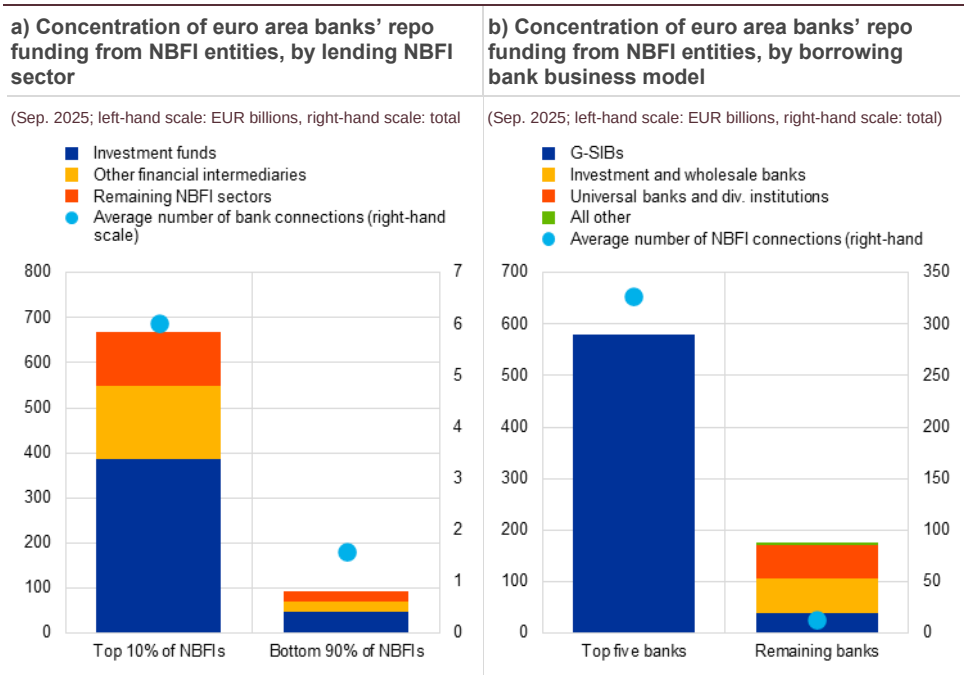
Repo funding is also concentrated on the borrower side, as the top five banks receive 80% of the total repo funding from NBFI entities. The banks receiving most of the repo funding from NBFI entities are mainly G-SIBs and investment and wholesale banks, probably reflecting the fact that NBFI entities use large banks to place their liquidity buffers.[24] The small number of larger recipients of NBFI funding are connected to a much higher number of NBFI entities than the smaller recipients, which mitigates risks from funding withdrawals by individual NBFI entities (**Chart 2.5** panel b). Individual banks with highly specialised business models might, however, struggle to counterbalance sudden withdrawals of NBFI funding. In turn, such a negative shock to an individual bank could have ramifications through connections to the wider financial system – or simply through negative sentiment. Indeed, previous analyses show that banks can substitute only 25% of repo outflows from NBFI entities, and replacement relies on funding from other banks.[25]

[24] These NBFI entities are, at the same time, intermediating funds raised from NBFI entities to other NBFI entities (see Chapter 3) and to smaller banks.

[25] See Franceschi, Kaufmann and Lenoci (2024).

Chart 2.5

Concentration and interconnection of bank repo funding from NBFI entities



Sources: ECB (SFTDS, supervisory data) and ECB calculations.
Notes: Panel a): "Top 10% of NBFIs" refers to the top 10% of all NBFI entities (around 110 of them) ranked by amount outstanding; "Bottom 90% of NBFIs" refers to the remaining ones. Amounts outstanding are computed by taking the monthly median outstanding position from daily repo data at bank-NBFI level as reported in SFTDS. Panel b): "Top five banks" refers to the five largest funding receivers from NBFI out of all significant institutions that receive NBFI funding, ranked by amount outstanding. The sample contains around 50 banks, such that the top five correspond to roughly 10% of banks in the sample. Amounts outstanding are computed by taking the monthly median outstanding position from daily repo data at bank-NBFI level.

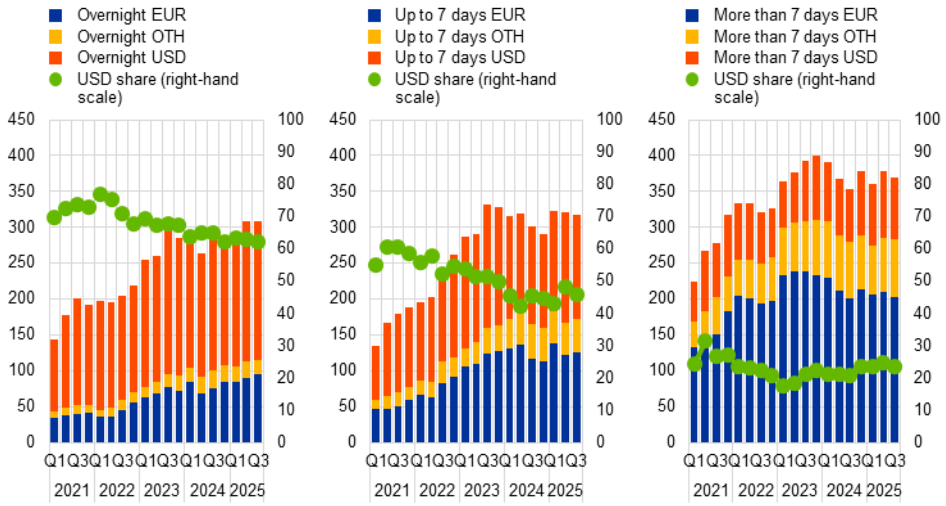
About half of total repo funding and most overnight repo funding is denominated in US dollars. Dollar repo funding from NBFI entities amounted to around €425 billion as of the first quarter of 2025. Euro area banks are highly active in intermediating dollars borrowed from US NBFI entities to non-US ones outside the euro area via the repo market.[26] A large share of this funding is extended with overnight maturity, exposing banks to roll-over and redemption risk should stress in the market emerge (**Chart 2.6**). Liquidity risks to banks are mitigated by the fact that several euro area banks run broadly maturity-matched repo books. However, as the counterparties to the two sides of the intermediation are different and may have different risk appetites, liquidity risk remains relevant. For example, US NBFI repo funding providers may be very sensitive to the credit quality of euro area banks and be inclined to withdraw dollar repo funding precisely when general market stress could increase the demand for it from non-US-based NBFI entities (such as hedge funds).

[26] For more information on banks' NBFI foreign counterparties, see Klaus and Mingarelli (2024). Market intelligence often notes that differences in applicable regulatory requirements between the United States and the euro area may explain why euro area banks play a prominent role in dollar intermediation. Euro area banks are subject to a 3% Tier 1 leverage ratio, plus any applicable G-SIB add-ons, measured at quarter-ends. US G-SIBs are subject to a supplementary liquidity ratio requirement of at least 5%, measured on a through-the-quarter daily average basis.

Chart 2.6

Euro area banks' repo funding, by currency and maturity

(Q1 2021-Q3 2025; left-hand scale: EUR billions, right-hand scale: percentages)



Sources: ECB (SFTDS, supervisory data) and ECB calculations.
Note: Figures represent the median at bank level over the quarter and then aggregated at quarter level across maturity buckets.

2.3 Banks' short-term debt securities funding from NBFI entities

Banks source short-term funding through debt securities markets, as well as from repos and deposits. Commercial paper (CP), a type of short-term zero-coupon debt with a maturity up to one year, is the main instrument for short-term debt securities funding. Four types of issuers are active in this market: banks, corporates, public entities and securitisation vehicles for asset-backed commercial paper. Several marketplaces for commercial paper coexist in Europe.[27] The euro CP market based in London is the largest (€436 billion in December 2024), with issuance mostly in US dollars and euro. The Negotiable EUropean Commercial Paper (NEU CP) market is based in Paris, where banks account for a significant share (with an outstanding amount of €214 billion at the end of 2024, they represent 70%[28] of the whole CP market, which accounted for € 300 billion at the end of 2024). Issuance is mostly in euro. After these come other national markets with smaller sizes.

The investor base of the NEU CP market is very concentrated: money market funds (MMFs) hold the largest share. MMFs are subject to regulatory constraints on the weighted average maturity of their assets and are therefore particularly well-suited for the short-term maturities of CP. At June 2025, they held €167 billion of the €230 billion of bank NEU CP identified in **Chart 2.7**, panel a. The other holders are mostly other NBFI entities, including insurance corporations and investment funds

[27] The "STEP" label (Short-Term European Paper) sets standards of harmonisation and transparency for securities issued on these markets. For a detailed overview, see Darpeix (2022).

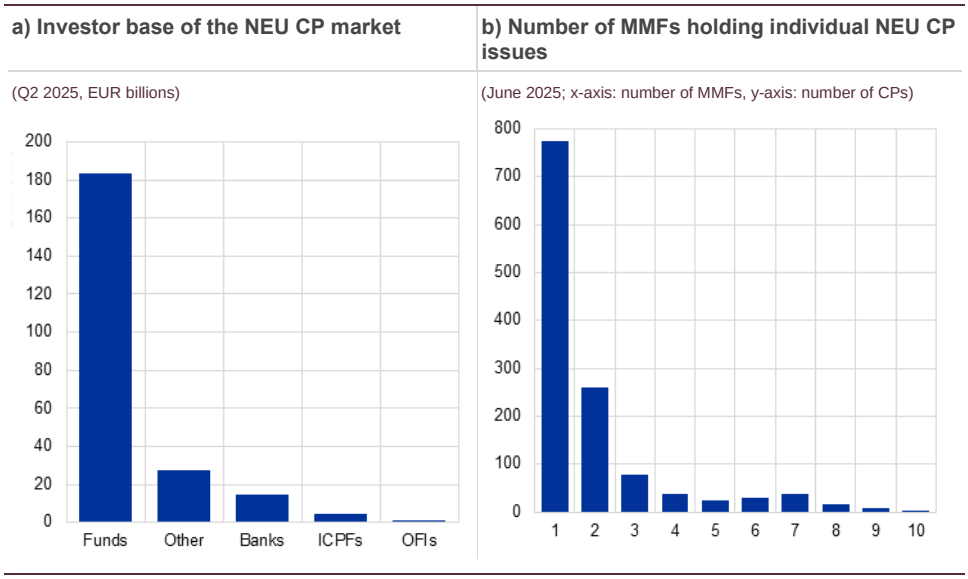
[28] Non-domestic banks represented 15% of the banking segment as of December 2024.

excluding MMFs. The investor base is very stable over time. Most CP issues are held by one or two funds only (**Chart 2.7**, panel b), but larger ones are held by more investors. This concentration is reinforced by the important similarity between MMFs' portfolios at the issuer level, which could increase funding shocks for issuers: Georg et al. (2024) show that correlated investors can adjust their holdings based on their similarity to other funds, impacting issuers' funding.

Commercial paper is also an important instrument for raising unsecured US dollar funding from NBFI entities.[29] European banks issue CP in dollars both in Europe (mainly in London) and directly in the United States, via their US-based entities (branches or subsidiaries). The importance of the US markets for euro area banks has declined since the 2016 US money market fund reform.[30] For French banks (the main euro area bank issuers in the United States), MMF holdings of CP, certificates of deposit and asset-backed commercial paper have declined substantially, and repo transactions have increased to about 76% of all MMF holdings (**Chart 2.8**).[31]

Chart 2.7

Sectoral and name concentration of the NEU CP market



Sources: TCN, ECB (SHS), OPC and Banque de France calculations.
Note: Panel a): "Funds" includes predominantly MMFs.

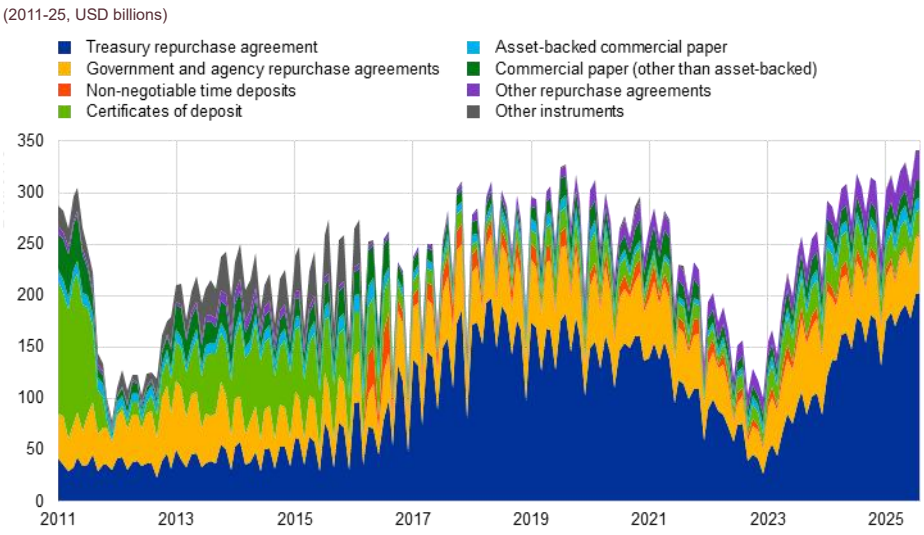
29 For more information on the international dimension of the EU MMF industry, see also ESRB (2024a).

30 See Aquilina, Schrimpf and Todorov (2023).

31 Repo funding through MMFs depends also on the monetary policy cycle. The Fed's overnight reverse repo facility is an alternative to the private repo market for US MMFs. Use of this facility by MMFs increased in 2022-23 due to higher rates, which triggered a decrease in their repo funding.

Chart 2.8

US MMFs' holdings of French bank debt instruments



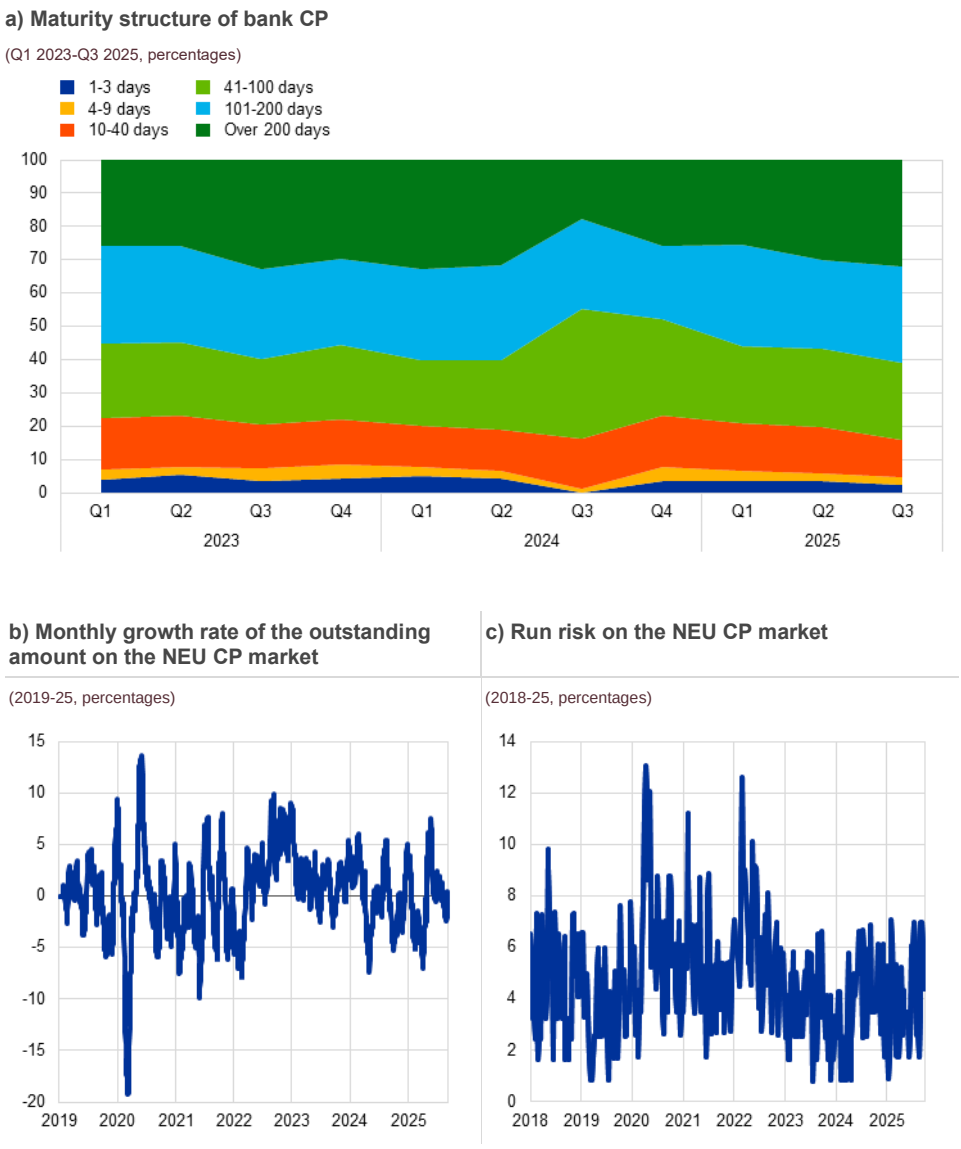
Sources: SEC portfolio data via OFR and Banque de France calculations.

Roll-over risk is the main funding risk for banks active in the CP market and has to be managed on a daily basis. The debt maturity structure contributes to this: the shorter the maturity, the higher the roll-over risk. Debt with a residual maturity of less than 40 days represented slightly more than 20% of outstanding amounts at the end of 2024 (**Chart 2.9**, panel a), and most of the debt had a remaining maturity of around three months. The volatility of funding can be significant. During the COVID-19 pandemic, the outstanding amounts of CP funding contracted by nearly 20% (**Chart 2.9**, panel b). A run measure which captures the drying up of new CP issuance due to lack of investor demand confirms that this contraction resulted from difficulties in rolling over outstanding CPs (**Chart 2.9**, panel c).[32]

[32] The run measure provides a measure at the issuer level with the following characteristics: an issuer is defined as "in a run" if its ratio of outstanding debt with a remaining maturity of less than one week to total outstanding debt is higher than 10% (thus capturing its need of short-term funding) and the issuer did not issue during the week. See Covitz, Liang and Suarez (2013).

Chart 2.9

Roll-over and run risk in the euro area bank CP market



Sources: TCN and Banque de France calculations.
Note: Panel c): Indicator defined in line with Covitz et al. (2013). It presents the percentage of issuers facing a "run", i.e. a dry-up of liquidity.

While NBFI entities usually hold CP to maturity, banks may come under pressure if MMFs are facing large redemptions.[33] Because of the short maturity, the secondary market for CP is reduced, and mostly active at times of crisis when investors face a shock and need to sell their holdings. Most NEU CP programmes issued by banks include the possibility for the issuer to buy back its outstanding CP. Usually, buybacks coincide with issuance of new CP, suggesting arbitrage of funding conditions by banks. However, the COVID-19 dash-for-cash illustrates that banks may elect to buy back their CP while issuance activity is reduced (**Chart 2.10**, panel a). Most buybacks occurred when MMFs faced significant outflows from their

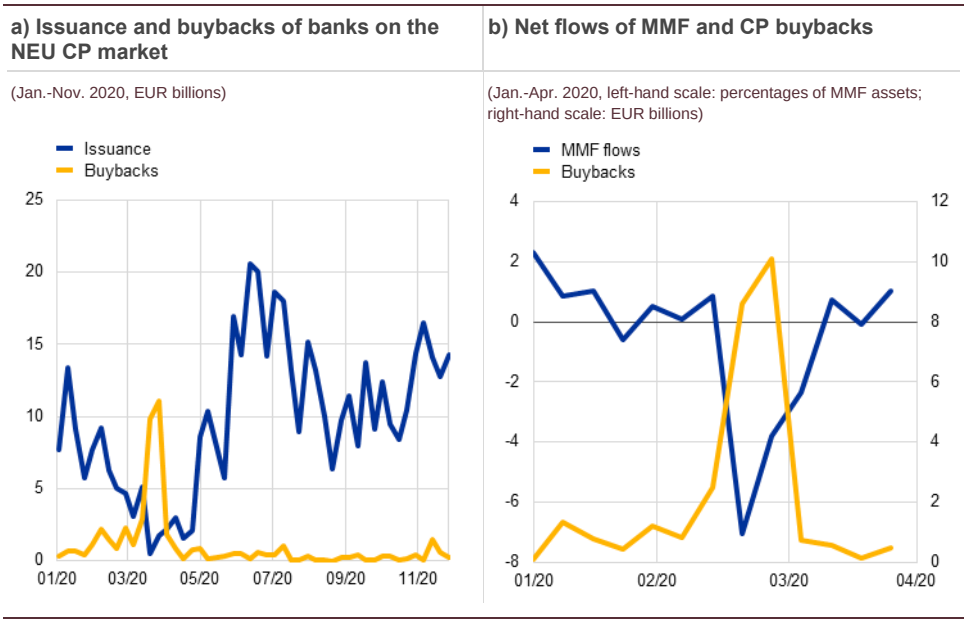
[33] See FSB (2024); also Recommendation of the European Systemic Risk Board of 2 December 2021 on reform of money market funds (ESRB/2021/9) (OJ C 129, 22.3.2022, p. 1).

institutional investors, e.g. the last two weeks of March 2020 (**Chart 2.10**, panel b). Matching portfolio data from MMFs, MMF flows and transactions on the bank CP market suggests banks provided liquidity to MMFs facing outflows by buying back their previously issued CP. This was an alternative to a "real" secondary market transaction, where alternative investors are necessary.

As banks have limited alternative sources of short-term unsecured wholesale funding and the CP investor base is highly concentrated, this could become a vulnerability during stress. Reliance on MMF funding via CP creates a transmission and amplification channel for shocks affecting MMFs, which can transform into a funding shock to banks if liquidity is not reallocated. However, the size of MMF funding is limited in relation to banks' liquidity buffers, and the impact of such shocks could be mitigated as long as banks can tap other sources of funding.

Chart 2.10

Bank CP funding during the COVID-19 dash-for-cash



Sources: TCN, EPFR and Banque de France calculations.

2.4 Banks' long-term debt securities funding from NBFI entities

NBFI holdings of bank bonds have increased significantly since monetary policy started to tighten. The share of euro area bank bonds held by euro area NBFI entities has increased by more than 30% since 2022, from €1 trillion to €1.3 trillion (**Chart 2.11**, panel a). Euro area NBFI entities hold 36% of outstanding bank bonds, and this share has increased by 3 percentage points over the last three years. In addition, while the holdings data do not break down non-residents' holdings by sector, it is likely that NBFI entities constitute a major part of the non-resident investors in bank debt.

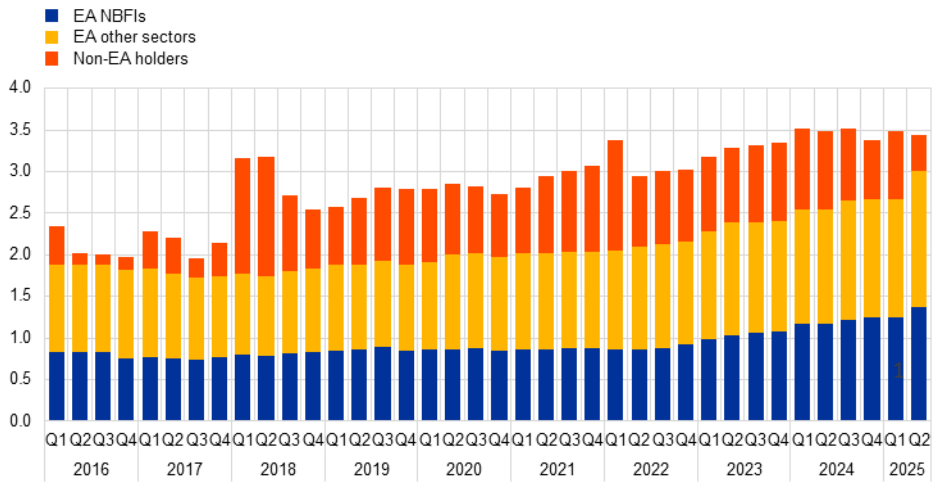
Within the NBFI sector, IFs are the largest holders of long-term bank debt, followed by insurance corporations. The share of NBFI holdings in euro area bank bonds denominated in dollars mirrors the proportion of total dollar-denominated issuance by these banks – roughly 13% (**Chart 2.12** panel a). Finally, more than 95% of euro area bank bonds held by IFs are actually held by IFs with bond or mixed asset strategies (**Chart 2.12**, panel b).

Chart 2.11

NBFI entities' holdings of euro area bank bonds

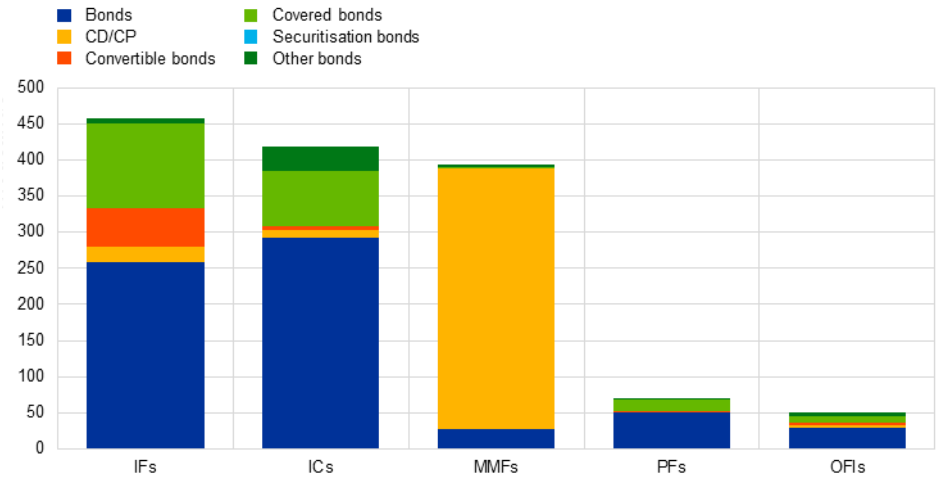
a) Bonds issued by euro area banks, by holder domicile

(Q1 2016 – Q2 2025, EUR trillions)



b) Euro area NBFI entities' holdings of euro area bank debt securities, by type of security

(Q2 2025, EUR billions)



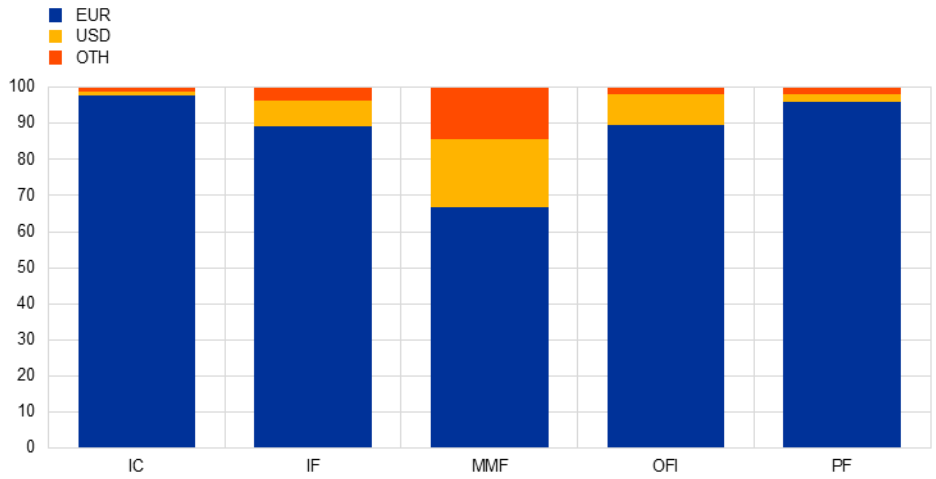
Sources: ECB (CSDB, SHS, supervisory data) and ECB calculations.

Chart 2.12

Investment fund holdings of euro area bank bonds

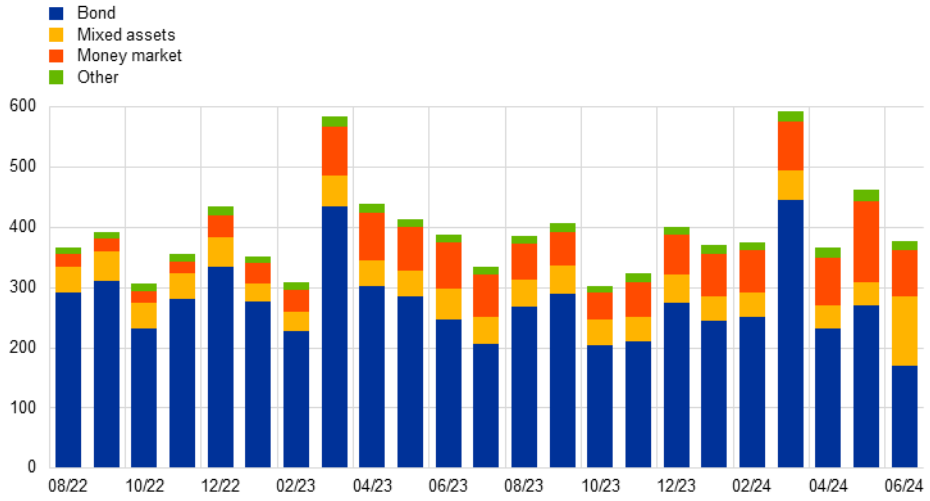
a) Euro area NBFI holdings of EA bank bonds, by currency

(Q2 2025, percentage shares of total))



b) Investment fund holdings of euro area bank bonds, by type of fund

(Aug. 2022-June 2024, EUR billions)



Sources: ECB (CSDB, SHS, supervisory data), LSEF Lipper and ECB calculations.
Note: Panel a): OTH includes al currencies other than the euro and the US dollar.

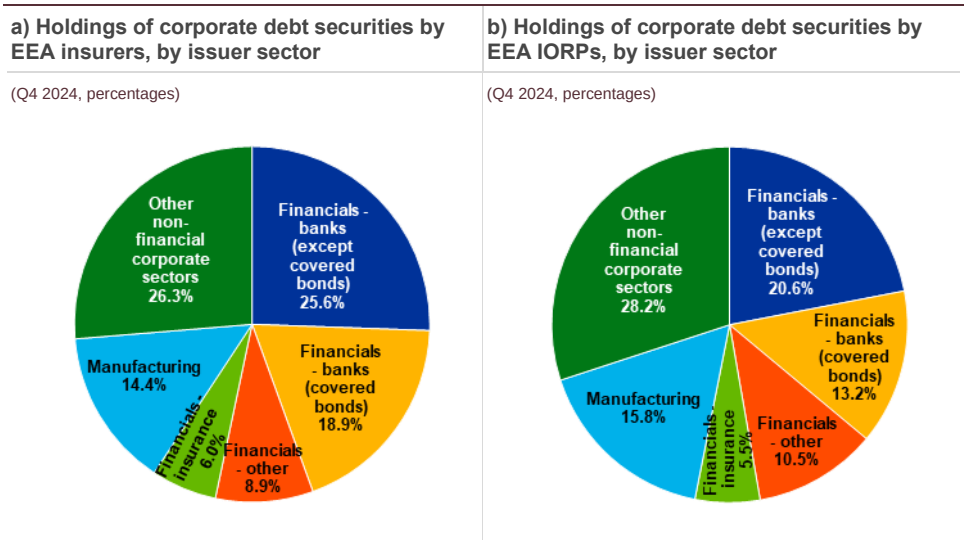
The remainder of this section focuses on the interconnections insurers and institutions for occupational retirement provision (IORPs) have with banks via debt securities holdings. We explore granular securities holdings data available at the EU level from EIOPA.

Insurers and IORPs tend to favour debt securities over equity when investing in banks. While insurers' bank-related holdings are overwhelmingly bond-focused, IORPs also hold a substantial portion of bank equity. From a consolidated perspective, insurers and IORPs based in the European Economic Area (EEA) collectively held €740 billion of bonds issued by banks, with insurers accounting for €625 billion of this (6.2% of their total assets) and IORPs €115 billion (4.0% of their

total assets) as of the end of 2024.[34] The banking sector dominates the corporate bond holdings of both sectors, accounting for 45% and 34% of their portfolios respectively (**Chart 2.13**), with a significant portion comprising unsecured debt (25.6% and 20.6% for insurers and IORPs) and covered bonds (18.9% and 13.2%).

Chart 2.13

Insurers' and IORPs' holdings of bank bonds



Sources: EIOPA (supervisory data) and EIOPA calculations.
Notes: EIOPA Solvency II list of assets S.06.02 and IORPs list of assets S.06.02. Solo prudential reporting as at Q4 2024. Breakdown of corporate bonds (CIC 2) by NACE classification.

Insurers and IORPs play a significant role in the overall investor base for euro area bank debt, collectively holding 10.6% of total bank bonds outstanding, with insurers accounting for 9.1% and IORPs 1.5%. Research by Du et al. (2025) suggests insurers invest more in corporate bonds in countries where these represent a higher share of total outstanding fixed-income securities. Furthermore, in countries with larger insurance and pension fund (ICPF) sectors, corporate bond markets, including both bank and non-bank segments, tend to be larger. In light of this, insurers and IORPs in countries such as Finland, France and the Netherlands, which have large banking sectors relative to GDP and substantial ICPF sectors, tend to have higher exposures to the banking sector (**Table 2.1**).

Insurers and IORPs prefer low-risk bank bonds, which may lead to cliff-edge effects in the event of rating downgrades. Insurers have a preference for low-risk corporate bonds and tend to hold investment-grade (IG) unsecured debt, mostly senior and in some cases junior, as well as secured debt such as covered bonds (**Chart 2.14**, panel a). IORPs exhibit similar behaviour (**Chart 2.14**, panel b).[35] Bonds downgraded from BBB to non-investment-grade are typically referred to as

[34] These figures refer to direct investments only, so they slightly underestimate the total exposure. For investments held within funds, SII data do not have sufficient granularity to identify bonds issued by banks. Due to consolidation and wider geographical scope, exposures reported to EIOPA tend to be higher than the exposures reported in the sectoral securities holdings statistics (Chart 2.10).

[35] IORPs reported the external rating provided for approximately 60% of their assets in Q4 2024.

"fallen angels" and it is often presumed that institutional investors tend to sell them.[36] Investment policies and regulation that result in a preference for secured debt and IG unsecured debt could potentially generate liquidations with cliff-edge effects if banks are downgraded to non-investment grade.

Table 2.1

Insurers' and IORPs' holdings as a share of total outstanding bank debt securities

Holdings of bank debt securities by euro area insurers and IORPs

(Q4 2024)

Country of bank	Bond issued by banks (CSDB data)	Bank bonds held by insurers (SII data)	Share held by insurers	Bank bonds held IORPs (IORPs data)	Share held by IORPs	Share held by insurers and IORPS
	EUR billions	EUR billions		EUR billions		
BE	128.0	8.6	6.7%	1.7	1.3%	8.0%
DE	1,302.3	96.1	7.4%	18.9	1.5%	8.8%
EE*	3.6	0.1	3.0%			
IE*	37.1	2.7	7.3%			
GR*	22.9	0.4	1.6%			
ES	312.6	32.8	10.5%	5.3	1.7%	12.2%
FR	1,156.1	130.1	11.3%	16.0	1.4%	12.6%
HR	2.1	0.1	3.4%	0.0	1.2%	4.6%
IT	332.6	17.6	5.3%	2.8	0.9%	6.1%
CY*	1.6	0.0	1.1%			
LV*	0.3	0.0	0.5%			
LT*	0.5	0.0	0.4%			
LU	54.4	2.3	4.2%	0.5	1.0%	5.1%
MT*	0.8	0.0	1.3%			
NL	409.3	55.6	13.6%	10.7	2.6%	16.2%
AT	172.6	14.3	8.3%	2.2	1.2%	9.5%
PT	42.8	0.8	2.0%	0.4	0.9%	2.8%
SI	3.5	0.1	3.0%	0.1	2.7%	5.7%
SK	18.9	0.8	4.3%	0.2	1.1%	5.4%
FI	99.1	10.9	11.0%	2.2	2.2%	13.2%
Other				0.6	0.1%	4.9%
Euro area	4,100.9	373.3	9.1%	61.6	1.5%	10.6%

Sources: EIOPA (supervisory data), ECB (CSDB) and EIOPA calculations.
Notes: For IORPs, countries marked with * shown as aggregate in "other" due to few IORPs reporting. Solvency II list of assets S.06.02, EIOPA Central Repository. Solo prudential reporting for insurers; individual reporting for IORPs. Filters: CIC category 2, CIC subcategory 21 (senior) 22 (convertible) 25 (hybrid) 26 (covered) 27 (covered) 28 (subordinated). NACE code, where K.64.1.9 identifies banks. Bonds issued by banks are identified based on the CSDB dataset.

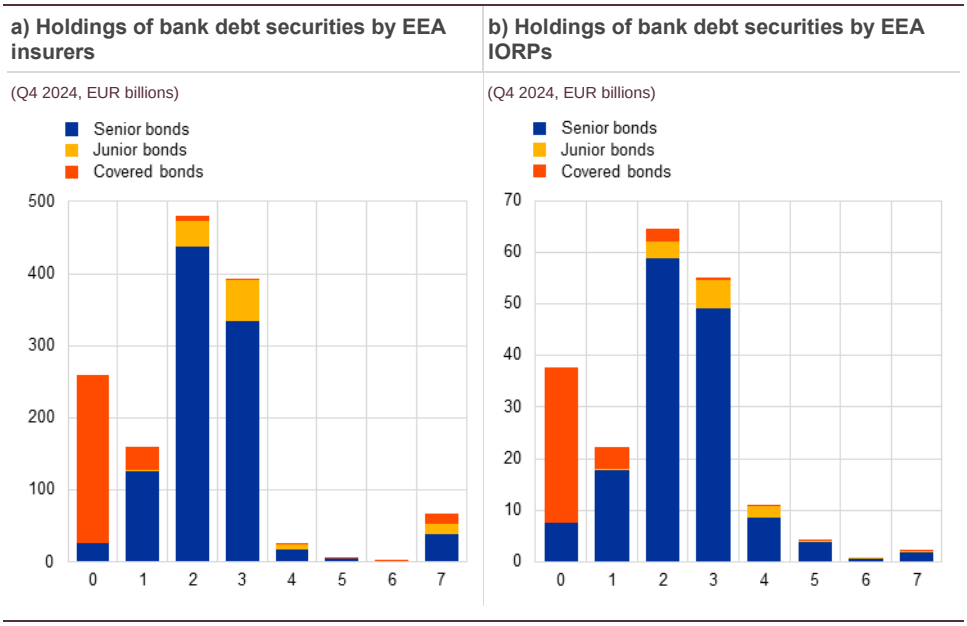
Insurers and IORPs in the euro area generally diversify their bank investments internationally, while those in non-euro area EU countries tend to invest in domestic banks. A notable home bias prevails in certain European countries; insurers in Iceland, Denmark, Sweden, Hungary, Poland and Romania display a

[36] EIOPA (2020) documented that EEA insurers tend to sell "fallen angels" (bonds issued by firms which have lost investment grade ratings) more than other downgraded bonds. In the first two quarters of 2020, for example, 7.8% and 6.9% respectively of bonds initially rated BBB and subsequently downgraded were sold. While the overall phenomenon was relatively contained, the impact on an individual bank's funding could be significant if its rating is downgraded below investment grade.

strong preference for domestic bank investments, ranking among the top six in terms of home bias for insurers (**Chart 2.15**, panel a). A similar pattern is observed for IORPs, with Poland, Norway, Sweden and Denmark showing a high proportion of investments held in domestic banks (**Chart 2.15**, panel b). This home bias can be attributed to the fact that their liabilities are in local currencies combined with a preference for avoiding currency risk and the costs and risks associated with hedging, making domestic investments a more appealing choice; in these countries the banking sector is sizable (in relative terms) and offers sufficient investability. Countries like Germany and France which have large banking sectors attract investments from insurers and IORPs located across borders. Insurers also invest in bonds issued by non-EU banks, mainly in the United States, the United Kingdom, Japan and Canada.

Chart 2.14

Credit quality and type of insurer and IORP holdings of bank bonds



Sources: EIOPA (supervisory data) and EIOPA calculations.
Note: The mapping between external ratings and credit quality steps (CQS) is as follows: CQS 0 (AAA), CQS 1 (AA), CQS 2 (A), CQS 3 (BBB), CQS 4 (BB), CQS 5 (B) and CQS 6 (CCC).

Insurers have had a stable market footprint since 2017, in keeping with their long-term investment horizons. Their positions across the entire period from the first quarter of 2017 to the fourth quarter of 2024 reveal some notable trends. Overall, they reduced holdings of covered bonds and junior bonds, while slightly increasing holdings of senior unsecured bonds (**Chart 2.16**). There was a temporary interruption in the purchase of senior unsecured bonds between 2021 and 2022. This was due to liquidations of bonds (of all types, not only bank bonds) to meet margin payments on interest rate derivatives. A little later, bonds were also sold because of lapses on life policies. Both aspects were related to the increase in risk-

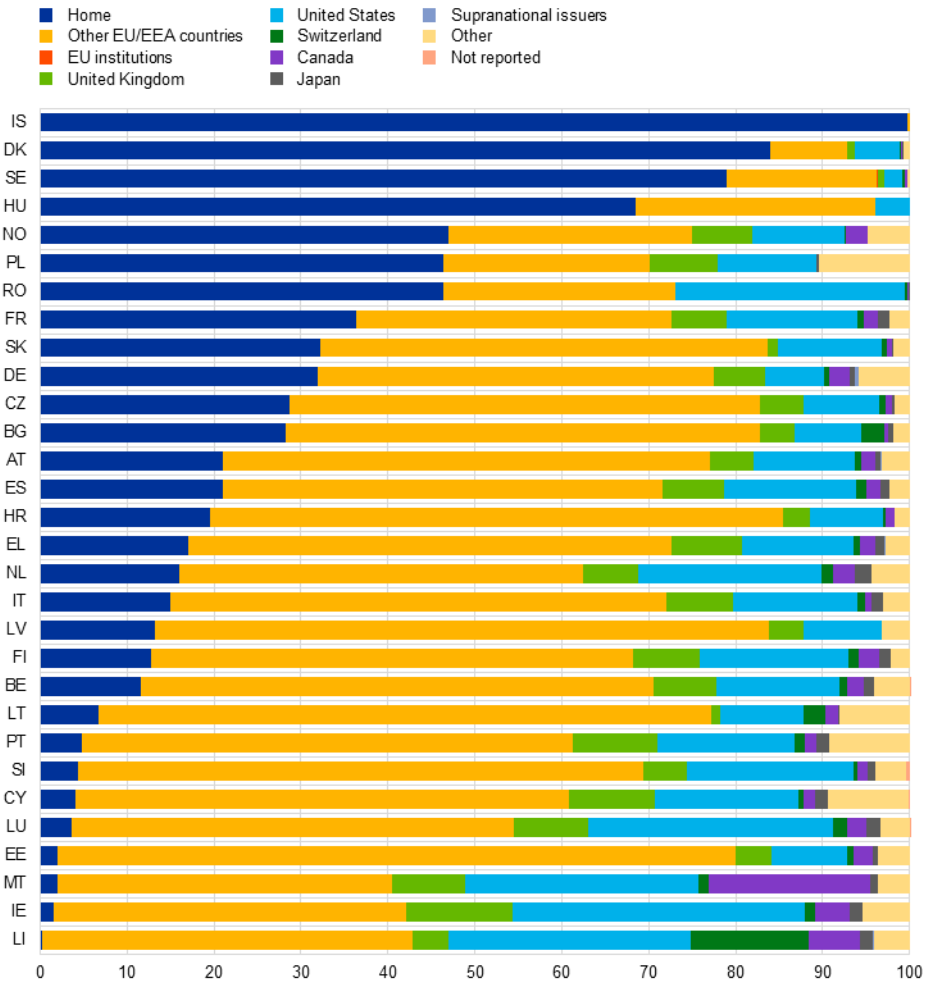
free interest rates.[37] However, this hiatus was followed by a resurgence in purchases of bank bonds. The recent trend in bank bond purchases mirrors the trend in other bonds, such as those issued by non-financial corporations and governments.

Chart 2.15

Distribution of insurer and IORP holdings of bank debt securities in EEA countries

a) Bank debt securities held by EEA insurers

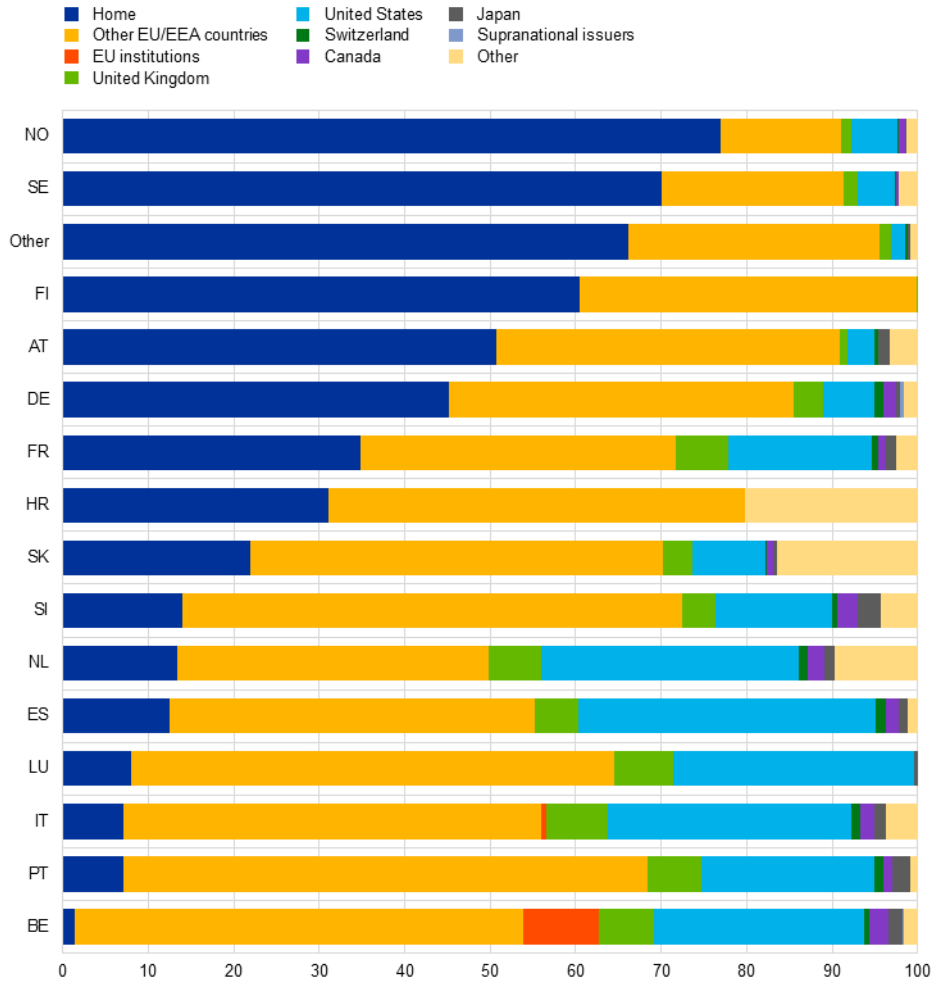
(Q4 2024, percentages)



[37] Rising interest rates tend to improve life insurers' capital ratios by reducing the present value of liabilities, but they can also generate liquidity stresses. European life insurers hedge against falling interest rates using interest rate swaps, typically receiving the fixed leg and paying the floating one. These contracts increase in value when interest rates fall, offsetting liability increases and stabilising capital positions. However, when rates rise, the derivatives decline in value, generating variation margin calls and increasing liquidity needs.
The increase in interest rates has also led to a higher surrender risk for life insurance products. In 2022 and 2023 many retail products began offering more competitive yields than existing insurance contracts, making them more appealing to policyholders. In some instances, the same distribution channels, such as banks that sell both savings products and insurance, may have encouraged policyholders to surrender their insurance policies in favour of alternative investment products with higher returns. This surge in surrenders exacerbates liquidity pressures, as insurers are forced to liquidate assets to meet redemption demands, while also facing a decline in premium income which further reduces their liquidity sources.
Bond liquidations by EU insurers have been documented in two topical focuses: EIOPA (2022) and EIOPA (2025).

b) Bank debt securities held by EEA IORPs

(Q4 2024, percentages)



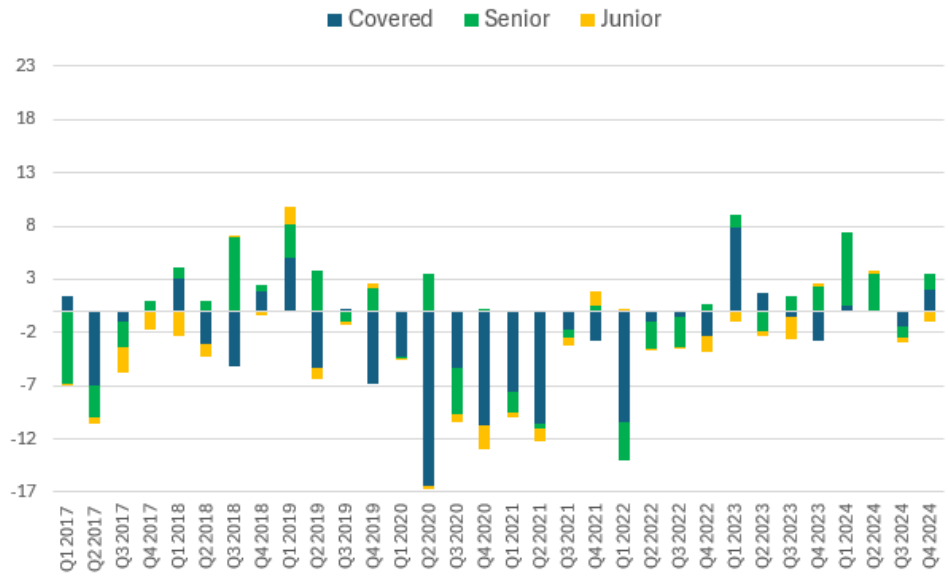
Sources: EIOPA (supervisory data) and EIOPA calculations.
Note: panel b): Other includes BG, CY, LV, DK and PL. Countries where IORPs do not have exposures to banks are not included.

Chart 2.16

Insurers' overall net transactions in bank bonds

Difference between bank bonds purchased by EEA insurers, and sold and matured

(Q1 2017-Q4 2024, EUR billions)



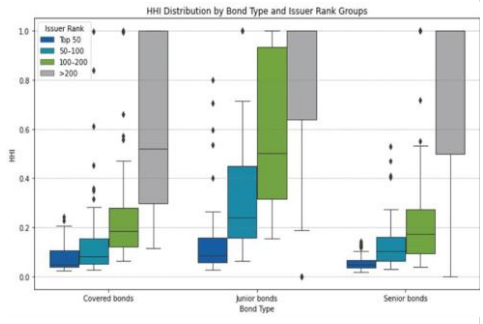
Sources: EIOPA (supervisory data) and EIOPA calculations.

Chart 2.17

Concentration of long-term bank funding from insurers and IORPs

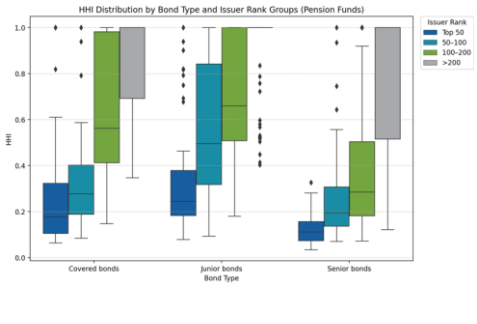
a) Insurance sector: HHI distribution by bond type and issuer (banks) rank group

(Q4 2024, HHI)



b) IORPs sector: HHI distribution by bond type and issuer (banks) rank group

(Q4 2024, HHI)



Sources: EIOPA (supervisory data) and EIOPA calculations.
Notes: HHI stands for Herfindahl-Hirschman Index. HHI measures concentration. The higher the HHI, the more concentrated a given distribution is. HHI is measured for holdings of all debt securities of a given type issued by a given bank; the chart shows the distribution of these HHI measures across EEA banks.

There is limited name concentration and overall the long-term funding base is diversified, at least for G-SIBs and larger banks; smaller issuers tend to be connected to fewer insurers. Larger banks, which often draw substantial investments from insurers, exhibit more diversified funding profiles, particularly in terms of the number of counterparties. While significant insurer holdings can influence a bank's funding base, the evidence points to a moderate degree of diversification. The funding base for senior bonds of the top 50 banks (by amount

invested by insurers) is relatively diverse, with an interquartile range of Herfindahl-Hirschman Index (HHI) values between 0.02 and 0.05, corresponding to a range of 50 to 20. By contrast, smaller banks, such as those ranked between 100 and 200, tend to have a more limited investor base, often with fewer than ten insurers holding their bonds (**Chart 2.17**, panel a). The investor base for junior bonds and covered bonds is more concentrated; this is not a concern given the low risk profile of covered bonds and the small amounts of junior bonds issued. Similar patterns are present for IORPs, albeit with a higher concentration in the funding base (**Chart 2.17**, panel b). For senior bonds issued by the top 50 banks (by amount invested by insurers) the funding base is more concentrated, with an interquartile range of HHI values between 0.07 and 0.16, corresponding to a narrower range of between six and 14 investors.

2.5 Financial stability assessment

Euro area banks receive a substantial part of their funding from NBFI entities. By relative share, banks with specialised business models such as asset managers and custodian banks, as well as investment and wholesale banks, exhibit the highest dependence on NBFI funding. By volume, however, universal banks and G-SIBs (including their respective investment banking subsidiaries and branches) stand out. These have easy access to other funding sources and might more easily withstand sudden outflows of NBFI funding, be it through their prime access to the interbank market or their strong retail deposit bases.

Despite substantial exposures, financial stability risks from bank-NBFI funding connections appear small, although the assessment of financial stability risks is constrained by data shortcomings. Exposures of euro area banks to NBFI funding remain moderate in terms of total volume, and banks with high funding volumes from NBFI entities can substitute funding more easily. In addition, deposits held by NBFI entities, which account for the bulk of total NBFI funding received by euro area banks, have tended to increase during past stress episodes, such as that in March 2020 (**Chart 2.1**, panel a, and Box 1).[38] However, the lack of transparency and different regulation of some NBFI subsectors can obscure the true extent of interconnectedness and risk exposures between banks and NBFI entities.

The idiosyncratic risks to financial stability which could originate from a shock to a large NBFI funding provider are contained. The high number of relationships between large banks and individual NBFI entities make it unlikely a sudden withdrawal of funds (even from a large funding provider) would trigger funding issues for the affected bank or the banking system as a whole. This is true for both short-term repo liabilities and debt securities, and long-term debt.

[38] The increase in NBFI entities' deposits at euro area banks during stress episodes is also shown in Chart A9, panel b of the Annex to ESRB (2025a).

However, pockets of vulnerability associated with short-term NBFI funding remain:

- Banks with highly specialised business models that rely mainly on NBFI funding and are hit by sudden NBFI withdrawals might face stress. Such idiosyncratic events might propagate to the broader system, either through interconnectedness or sentiment.

- Even though banks may have many relationships with individual NBFI entities (and hence risks appear uncorrelated), these funding sources may all share the same business model (money market funds, particular investment funds, etc.). As a result, short-term funding from these groups may be correlated and more volatile during times of stress. This concentration (or correlation) risk increases vulnerability to idiosyncratic shocks affecting those specific NBFI entities, which could lead to abrupt funding shortages for the banks involved.

- Funding from NBFI entities is often denominated in foreign currencies, particularly the US dollar, while banks' liquidity buffers are mainly in euro. Banks using short-term dollar funding may be vulnerable to shocks originating from the dollar funding markets.

Long-term investors such as insurers and pension funds tend to hold diversified portfolios of high-quality bank debt, but rating downgrades could trigger divestments. Insurers and IORPs primarily hold IG bank bonds, as their investment policies and regulation tend to favour secured and IG unsecured debt. These policies mitigate credit risk to insurers and IORPs, but may potentially lead to liquidations with cliff-edge effects if a bank's rating is downgraded to non-IG. Insurers and IORPs domiciled in the euro area tend to be internationally diversified. Those with non-euro currencies exhibit a preference for investing in domestic banks. Name concentration on the investor side is limited, at least for G-SIBs and larger banks, while smaller banks tend to be connected to fewer insurers. Insurers and IORPs are stable, long-term investors; the weighting of bank debt in insurers' portfolios has been broadly stable over the years.

NBFI funding may be vulnerable to extreme market corrections where the three sources of short-term funding from NBFI entities to banks are correlated, and therefore not offer diversification benefits. While deposits, repos and short-term unsecured debt securities funding are provided by different groups of NBFI entities, there are overlaps between providers. For example, money market funds both provide dollar-denominated repo funding and invest in bank dollar-denominated commercial paper. In the event of market stress, such overlaps may lead to correlated funding outflows from banks. Even when NBFI funding providers do not have any overlap between funding sources, a negative and systemic shock to asset markets could nevertheless prompt then to recall liquidity held at euro area banks to meet outflows and redemptions, leading to a broad-base decline in NBFI funding. For example, investment funds depositing funds with euro area banks may face losses on their investments; these would lead to customer outflows at the same time as banks faced losses on the collateral supporting their repo funding to NBFI entities, and investment funds providing repo funding would increasingly restrain funding to

banks amid concerns about credit quality. Such a systemic event would initially impact the largest banks in the euro area, as they are the principal recipients of NBFI funding. It may then propagate to other banks and prompt the sector to pull funding to NBFI entities, potentially amplifying stress across the system. System-wide stress test models may be suitable for analysing the complex dynamic interconnections between banks, different NBFI sectors and asset markets.[39]

[39] For discussion of the capabilities of system-wide stress test models, see Section 5 in Budnik et al. (2024). For examples of their application, see Sydow et al. (2024), Gourdel, Maqui and Sydow (2019) and Fukker et al. (2022).

3 Banks' credit exposure to NBFI entities

Asset-side exposures of euro area banks to NBFI entities were equivalent to around 10% of the total assets of significant institutions (SIs) as of December 2024.[40] Based on consolidated supervisory reporting, lending (including loans and reverse repos) and security holdings constitute the most significant portion of banks' on-balance-sheet exposures to NBFI entities, while the positive fair value of derivatives traded with them also accounts for a considerable share (**Chart 3.1**, panel a).[41] Between year-end 2021 and December 2024, the relative size of asset-side exposures to NBFI entities rose by more than one percentage point of total bank assets, largely driven by a steady increase in loans and intermittent rises in the positive fair value of derivatives. Exposures to NBFI entities tend to generate less income than other exposures. However, income derived from exposures to NBFI entities has also increased markedly as monetary policy has tightened, and now represents 5% of banks' total interest income. In terms of country distribution, total asset-side exposures to NBFI entities are highest in French SIs; relative to total assets, exposures are also large for SIs in the Netherlands, Germany and Ireland (**Chart 3.1**, panel b). This holds true when considering both credit exposures and securities. However, a significant share of these exposures is intragroup, where a bank lends to an NBFI entity within the same banking group. The nature and extent of intragroup exposures will be discussed in detail later in this chapter.

This chapter examines the composition and riskiness of bank loans to NBFI entities and reverse repo transactions with NBFI entities (see Section 3.1) as well as bank holdings of securities issued by NBFI entities (see Section 3.2). An assessment of financial stability risks associated with these exposures concludes (see **Section 3.3**). Throughout the analysis, the following NBFI sectors are considered: investment funds (IFs), captive financial institutions (CFIs), financial auxiliaries (FAs), money market funds (MMFs), pension funds (PFs), insurance corporations (ICs) and other financial intermediaries (OFIs). Private equity and private credit funds (PE/PC) and alternative investment funds (AIFs) are excluded from the detailed analysis due to data limitations: we only find relatively small bank exposures to these types of entities (€4 billion for PE/PC and €4.5 billion for AIFs), far below the figures implied by supervisory intelligence. This is likely a result of data gaps particularly relevant for this particular type of entity (see **Chapter 5** for further details on data gaps and limitations). Further private credit exposures might be captured under OFIs as exposures to special-purpose vehicles.

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40 The analysis of this chapter considers only euro area significant institutions. It includes euro area bank exposures to global NBFI entities. NBFI entities are identified using the algorithm and the classification in Lenoci and Letizia (2021) when possible, complemented with the ESA sectoral classification.

41 Derivatives are not examined in detail this analysis and may be expanded on in future work. Off-balance-sheet exposures may also include committed but undrawn credit lines and guarantees.

3.1 Banks' lending to NBFI entities

Bank loan exposures to NBFI entities constitute 7% of SIs' total assets and can be identified in AnaCredit. Due to the limitations of consolidated supervisory data, a detailed analysis of bank credit exposures to NBFI entities is only possible with granular exposure-level data reported by banks in the AnaCredit database. However, AnaCredit data are not based on consolidated reporting as they cover the balance sheets of every euro area-based entity of banking groups.[42] The data are reported on an entity-by-entity basis and therefore include intragroup exposures which are eliminated from supervisory reporting in the consolidation process. These two features of the data lead to a discrepancy between supervisory data and the more granular data used in this section which cannot be fully reconciled.[43] In particular, only limited data on euro area banks' exposures to US-based NBFI entities are available. While supervisory reporting of large exposures may in principle provide some additional information on exposures not captured in AnaCredit (including large exposures of non-euro area bank subsidiaries), the incremental value added of those data is likely limited, and the workstream prioritised using its limited resources for work on other granular datasets.

[42] Exposures booked in non-euro area subsidiaries of a euro area bank or in a non-bank entity of a euro area bank are not reported in AnaCredit, but are included in the bank's consolidated exposure reported in the supervisory banking data.

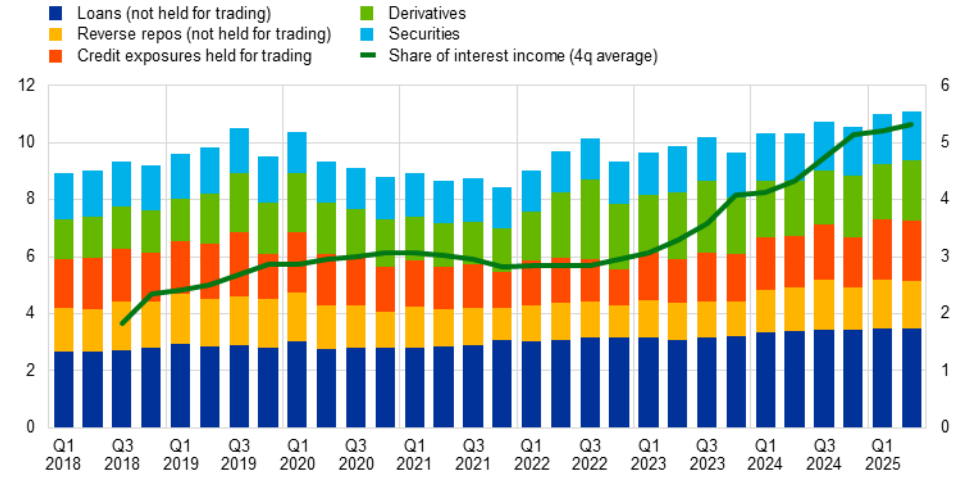
[43] Granular exposure data may also be accessed via supervisory reporting of large exposures, which provides consolidated exposure of a banking group to a group of connected clients. However, this source overlaps to a significant degree with AnaCredit and therefore has not been used for this report.

Chart 3.1

Banks' asset-side exposures to NBFI entities over time and by sector and country

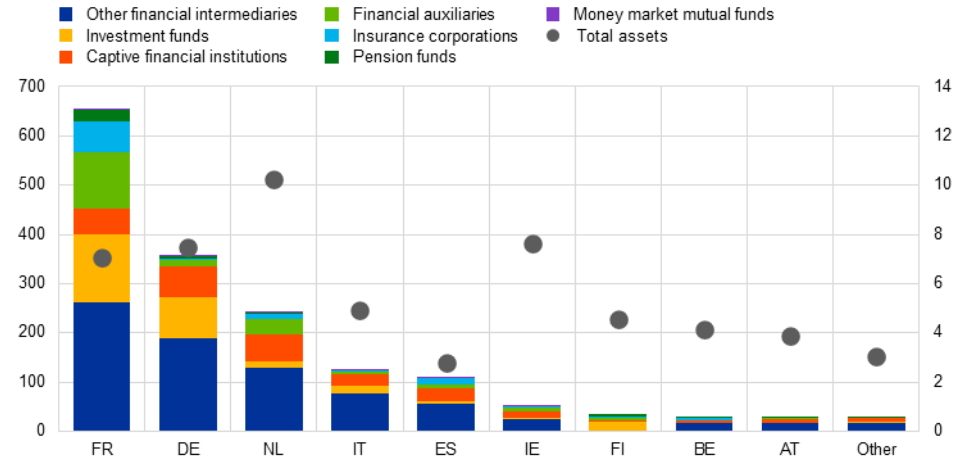
a) Banks' consolidated asset-side exposures to NBFI entities over time

(Q1 2018-Q2 2025; percentages)



b) Banks' credit exposures to NBFI entities by sector and country

(Q4 2024; left-hand scale: EUR billions, right-hand scale: percentages)



Sources: ECB (AnaCredit, supervisory data) and ECB calculations.
Notes: Panel a): Based on consolidated supervisory data. Securities do not include fund shares. Interest income from loans and debt securities only. Loans and reverse repos classified as "held for trading" are presented together as "Credit exposures held for trading" due to the scope limitations of supervisory reporting. More granular data indicate that reverse repos account for a large share of this item. The value of derivatives is reported using carrying amounts. Panel b): Based on granular AnaCredit data. Credit exposures include term loans, revolving credit, drawn credit lines, reverse repos and other short-term deposits. The figures for credit exposures (not held for trading) differ slightly from supervisory data given differences in the consolidation perimeter and the sample of banks.

Credit exposure to NBFI sectors

OFIs are the largest NBFI recipients of bank credit. Based on the granular data, lending to OFIs comprises about 50% of SIs' credit exposure to NBFI entities, followed by IFs at 17%,[44] CFIs at 15%, FAs at 11%, ICs at 6 % and PFs at 2.2%. Within the OFI sector this exposure can be further broken down into security and derivatives dealers (10%), financial vehicle corporations (FVCs) (3.5%), lending financial corporations (11%) and specialised financial corporations (4%), with the remainder comprising of other entity types or entities that cannot be identified due to data limitations. PFs and MMFs have the smallest reliance on bank credit, both in terms of aggregate volume and when compared with total assets,[45] given their typical reliance on own capital or investor contributions and limited use of leverage. The composition of credit exposures to NBFI sectors varies materially across countries (**Chart 3.2**), reflecting differences in the structure of national financial systems and individual bank business models.

Banks maintain relatively high exposures to non-euro area NBFI entities, which often are denominated in foreign currencies. Debtors domiciled outside the euro area make up 37% of total credit exposures to NBFI entities. Of this, only 1.8% is to debtors within the EU but outside the euro area. The most common countries of non-euro area domicile are the United Kingdom, the Cayman Islands, the United States and Japan, together representing approximately 85% of the non-euro area group of countries. Exposures to non-euro area borrowers are most prevalent in bank credit exposures to MMFs (79%), PFs (72%), OFIs - unknown (71%), IFs (62%) and securities and derivatives dealers (54%). Among foreign currencies, the US dollar is the most common, comprising 17% of total credit exposures.

The majority of banks' exposures to OFIs and financial auxiliaries are intragroup. These are identified using a combination of data sources, including RIAD, supervisory data and Orbis. Each source reports in various formats whether a bank has a majority ownership relationship with an NBFI entity. Approximately 68% of credit exposures to OFIs and 57% of those to FAs are classified as intragroup, with a bank extending credit to an entity within its own banking group (**Chart 3.3**, panel a). Additionally, about half of IC exposures are either to entities within a banks' own group or to entities within another banking group in the euro area, reflecting the fact that many euro area insurers are associated with a banking group. The shares are considerably lower for IFs, PFs and MMFs. For many banks, especially smaller banks, the majority of NBFI credit is extended to entities within the same group (**Chart 3.3**, panel b). Given the difficulty in fully identifying intragroup relationships due to data limitations, this analysis may underestimate the true extent of all intragroup links and constitutes a minimum bound. It also does not fully capture

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[44] Using supplementary data from the ECB's list of investment funds, the investment fund subsector can be further broken down by fund domicile/strategy into non-EU funds (62.4% of IF credit exposures), real estate funds (22.3%), hedge funds (4.16%), bond funds (2.5%), mixed funds (1.2%), equity funds (1%) and missing/other (6.3%).

[45] Comparing total bank credit exposures to total assets for each NBFI subsector, the relative share for IFs is 1.56%, for ICs 1.14%, for PFs 0.54% and for MMFs 0.06%. Data on PE/PC and OFIs are not available.

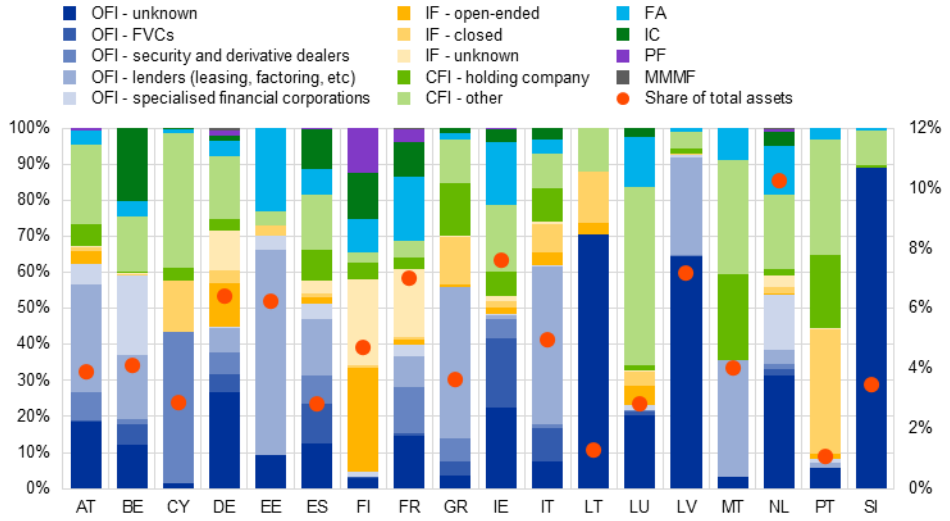
sponsor relationships, where banks set up off-balance-sheet vehicles which are not consolidated but may receive credit or liquidity support from the sponsoring bank.

Chart 3.2

Breakdown of NBFI exposures by sector

Bank credit exposures, by detailed sectoral classification and creditor country

(Q4 2024; left-hand scale: share of credit exposures to NBFI entities, right-hand scale: NBFI exposures as a share of total asset)



Sources: ECB (AnaCredit) and ECB calculations.
Notes: OFI stands for other financial intermediaries, FVCs stands for financial vehicle corporations, IF stands for investment funds, CFI stands for captive financial institutions, FA stands for financial auxiliaries, IC stands for insurance corporations, PF stands for pension funds, MMF stands for money market funds. Credit exposures include term loans, revolving credit, drawn credit lines, reverse repos and other short-term deposits. "IF - unknown" tend to be investment funds domiciled in a non-euro area territory, with over 80% being registered in the Cayman Islands. Cayman Islands funds are usually hedge funds.

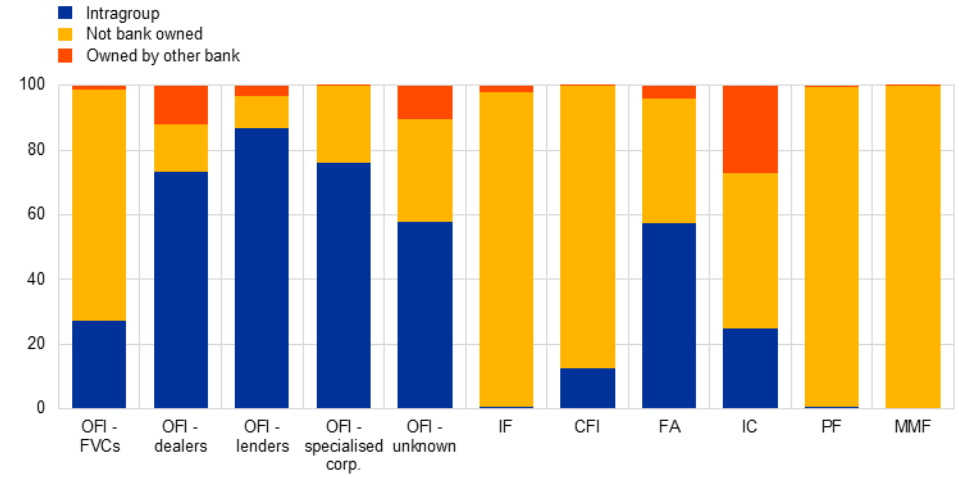
The OFIs connected to banking groups are mainly prime brokers, securities firms, securitisation vehicles, leasing units and financing conduits. The business cases behind intragroup lending to OFIs are diverse. OFIs often adopt a specialised business model which, due to limited diversification, may lead to a higher cost of external finance than that of a banking group. For example, banks often own leasing companies to finance assets leased by their corporate and retail customers. These leasing companies may benefit from access to preferential intragroup funding, allowing the banking group to provide the customer with a broader range of financial services. A similar argument applies to prime brokers. Other OFIs, such as securities dealers, may need bank credit to manage their liquidity and ensure they can service their financial obligations, smoothing their cash flows.

Chart 3.3

Intragroup exposures between banks and NBFI entities

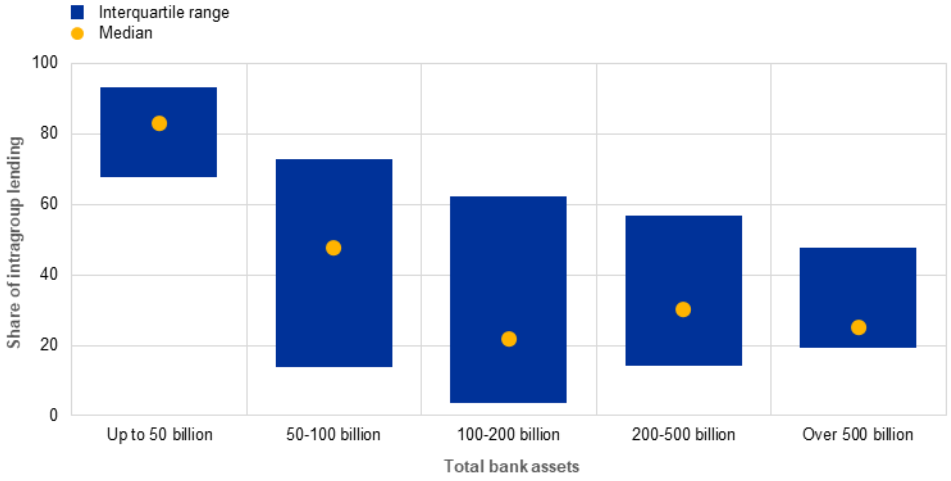
a) Bank credit exposures to intragroup entities and external NBFI entities, by sector

(Q4 2024s, percentage shares of credit exposures to NBFI entities)



b) Share of credit exposures to intragroup entities, by bank size

(Q4 2024; EUR billions, percentages)



Sources: ECB (AnaCredit) and ECB calculations.
Notes: Credit exposures include term loans, revolving credit, drawn credit lines, reverse repos and other short-term deposits. Intragroup exposures to FVCs consist largely of exposures to special-purpose vehicles used to achieve segregation between cover pools and the issuer bank in Italy. As these vehicles take over the assets backing the covered bond from the bank, the corresponding deferred purchase price is reported as a loan from the bank to the FVC. Such linkages do not represent an actual credit relationship.

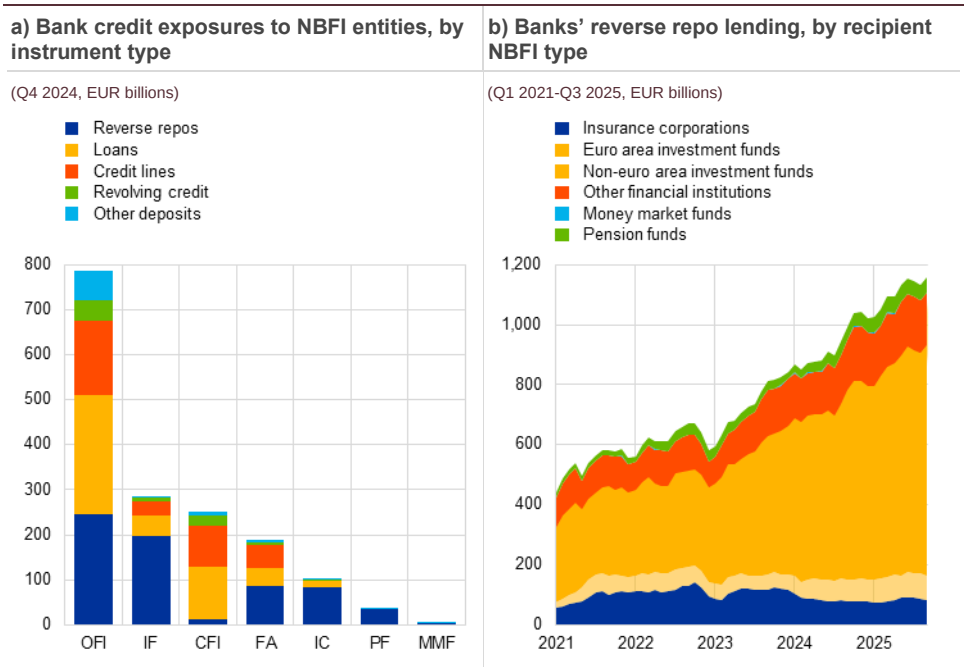
As many types of NBFI entities use bank credit to enhance their liquidity and funding capacity, they typically have a high share of short-maturity and collateralised instruments. Many use the banking system for liquidity management or to increase their leverage by pledging securities. This is reflected in the high share of reverse repos, credit lines and revolving credit in bank credit to dealers, IFs, ICs, PFs and MMFs (**Chart 3.4**, panel a). While undrawn committed credit lines and revolving credit facilities could expose banks to liquidity risk from entities utilising these instruments in periods of market stress, off-balance-sheet exposures to them

are limited for most banks.[46] However, some large banks with more significant off-balance-sheet exposures may have higher exposure to liquidity risk from unexpected drawdowns.[47]

Longer-term funding is more common among those NBFI entities which typically hold longer maturity assets or require greater investments in infrastructure. CFIs, FAs and some types of OFI, such as financial corporations engaged in lending and specialised financial corporations, typically use a higher share of longer maturity term loans (**Chart 3.4**, panel a). in addition, real estate funds use term loans more extensively to obtain leverage for expanding their asset portfolios or to manage risks related to liquidity transformation.[48] CFIs and leasing companies require stable longer-term funding to match the longer repayment periods of their customers and avoid maturity mismatch risk.

Chart 3.4

Bank credit exposures to NBFI entities, by instrument type



Sources: ECB (AnaCredit, SFTDS) and ECB calculations.
Notes: Information on reverse repos is sourced from two datasets: AnaCredit and SFTDS. AnaCredit provides data on repo contracts still active at the end of the month, providing a point estimate of outstanding repos (shown in panel a). SFTDS offers daily data on outstanding positions, making it possible to calculate averages or median values over the course of a month (shown in panel b). Panel a): The small share of deposits to NBFI entities likely reflects misreporting, including cases where some bank subsidiaries are recorded as other financial intermediaries, and inconsistencies in the classification of instrument types. Panel b): Quarterly median values of daily aggregated outstanding positions are reported. Given limitations in data breakdowns, "Other financial intermediaries" comprises all NBFI entities in the sectors of OFIs, CFIs and FAs as per previous breakdowns. Reverse repo lending to money market funds is very small, below €1 billion, and therefore may not be visible on panel b).

[46] According to AnaCredit, total off-balance-sheet exposure to NBFI entities around €32.8 billion, or 2.3% of total identified on-balance-sheet exposure. The median relative off-balance-sheet exposure is 1.36%.

[47] Four banks with NBFI exposures in excess of €1 billion report off-balance-sheet holdings equal to more than 20% of what they carry on their balance sheet.

[48] For more details on bank lending to real estate funds, see "Real estate funds and banks in the EU" in ESRB (2025a) and Bierich et al. (2024).

The non-performing loan ratios for bank lending to NBFI entities are significantly lower than in banks' broader corporate loan portfolios. The large share of collateralised and short-maturity lending, such as via reverse repos, reduces the credit risk banks are exposed to in their lending to NBFI entities. The overall risk is further ameliorated by the prevalence of intragroup exposures – the non-performing loan ratio for intragroup lending is 0.002%, compared with 0.18% for non-related entities and 2.3% for total loans. However, such intragroup exposures may give rise to either contractual commitments to support the NBFI entity, or to step-in risks: if the NBFI entity were to face financial difficulties, the parent bank might opt to support it despite having no contractual obligation to do so, to mitigate legal and reputational risks.[49] While around 10% of credit exposures to NBFI entities are classified as subordinated debt, which could result in higher bank losses in a stress scenario, these are typically concentrated in intragroup exposures to FVCs. This is likely part of structured finance or securitisation activity, where the bank assumes a first-loss role to improve the credit rating of more senior tranches and meet risk retention requirements.[50]

Reverse repo lending by banks to NBFI entities

Reverse repo lending by euro area banks is a large component of overall bank-NBFI linkages and has more than doubled over the past four years. By far the largest recipient sector is IFs, whose borrowing activity is driving the overall growth in volumes (**Chart 3.4**, panel b). The vast majority of this lending goes to funds domiciled outside the euro area, and so a high share of it is denominated in foreign currencies. Euro area G-SIBs are the main funding providers, with more than 50% denominated in US dollars and roughly 20% in other foreign currencies (**Chart 3.5**, panel a). This high share reflects the intermediation of US dollars by some euro area banks, in particular via their US branches and broker-dealer subsidiaries, which source US dollars from US-based NBFI entities to non-US ones, in particular hedge funds based in the Cayman Islands (see also Sections 2.2 and 2.5).[51]

Banks' reverse repo lending to NBFI entities is highly concentrated, with the five largest lenders making up about 80% of the total (Chart 3.5, panel b). This degree of concentration is a potential financial stability risk, as it makes systemic crises more likely if one of the few large lenders were to face difficulties. However, the largest reverse repo lenders to NBFI entities have significantly more connections with them than do other banks, averaging around 310 connections versus 16. This diversification of repo relationships is a mitigating factor, as it shields banks from the idiosyncratic risk of individual failures. Taking a counterparty perspective, NBFI repo borrowing from euro area banks is concentrated too, with the top 10% of entities receiving about 88% of repo funding (**Chart 3.5**, panel c). Equally, the largest

[49] See BCBS (2017).

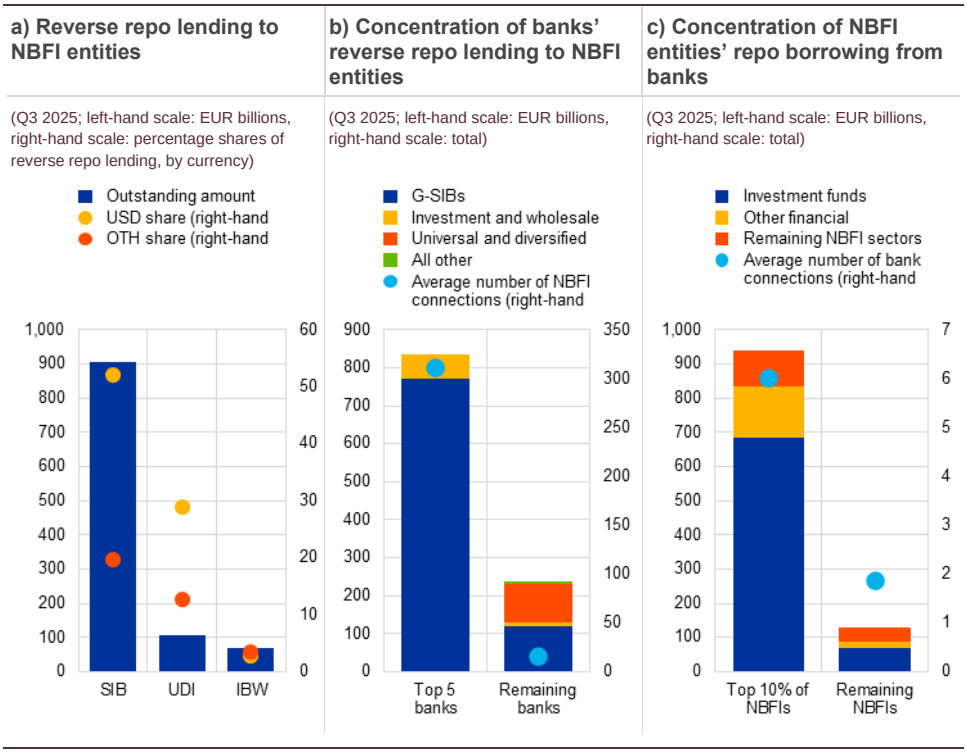
[50] Typically, euro area banks engage in synthetic securitisations where an NBFI investor assumes the risk of a loan portfolio, but the bank retains ownership, funding and management of the portfolio along with a small first-loss exposure, usually around 1% of the transaction volume. The EU Securitisation Regulation requires the originator, sponsor or original lender of a securitisation to retain a material net economic interest of not less than 5% in the securitisation on an ongoing basis.

[51] For an analysis of dollar intermediation by euro area banks, see Klaus and Mingarelli (2024).

recipients receive funding from a much larger number of banks on average than the remaining NBFI entities, at six versus fewer than two on average. In contrast with reverse repos the provision of other types of credit, such as term loans and credit lines, to NBFI entities is much less concentrated. Here again, diversification mitigates financial stability risks, as NBFI entities with large funding volumes from banks tend to be well diversified, helping them to maintain their funding levels if individual banks decide to end the lending relationship.

Chart 3.5

Reverse repo lending by banks to NBFI entities



Sources: ECB (SFTDS, AnaCredit, supervisory data) and ECB calculations.
Notes: Panel a): SIB stands for global systemically important banks, UDI stands for universal and diversified institutions, IBW stands for investment and wholesale banks. OTH includes all currencies other than the euro and the US dollar. Panel b): The top five banks are defined as the banks with the five largest volumes in reverse repo funding provision to NBFI entities.

Bank exposures to potentially leveraged NBFI entities

Lending to NBFI entities creates pockets of vulnerability, as many NBFI counterparties follow business models predicated on the use of leverage. It is not possible to calculate leverage metrics for individual NBFI counterparties of banks due to data limitations, and also for conceptual reasons. However, classification by sector, business model and geographical location can shed light on the scale of bank interconnections with NBFI entities that may potentially adopt leveraged strategies. NBFI entities that invest in residential or commercial real estate, as well as hedge funds, international securities or commodities trading firms and loan originators (such as leasing companies), rely to varying degrees on leverage to achieve their investment objectives. These entities will be treated as potentially leveraged in the rest of this section, although not all entities in a specific NBFI sector (e.g. real estate

funds) may actually use leverage.[52] However, the scale of such leverage, the riskiness of the investment strategies for which it is used and the interaction with maturity and liquidity mismatches potentially exacerbating the risk profiles differ across firms, jurisdictions and business models, and even within business models.[53] The group of potentially leveraged NBFI entities identified is not homogenous, and banks' exposures to them vary in terms of credit, counterparty and liquidity risk. Specifically, we distinguish between entities using leverage in short-term market-based activities, such as hedge funds and international securities or commodities trading firms, and those using leverage to fund real assets over the long run, such as real estate funds. Other NBFI entities, including insurers, pension funds, money market and investment funds, are assumed to use no or limited leverage, given that they are typically restricted in their ability to do so by regulation.[54] Captives and financial auxiliaries are usually conduits for financing non-financial corporations or banks and their credit risk is often equivalent to that of the owner.

The exposures to the potentially leveraged entities presented in this section likely represent a lower bound for the total. Due to geographical data limitations (see **Chapter 5**), the identified exposures to potentially leveraged NBFI entities capture only a subset of exposures. If exposures are booked in foreign (e.g. US or UK) affiliates of European banks, or structured via special-purpose vehicles or direct lending to firms sponsored by PE funds, they would likely not be visible in the datasets collected in the euro area.[55] For these reasons, the overall exposures to hedge funds in particular are likely to surpass the total identified in granular ECB data.

Credit exposures to potentially leveraged NBFI entities are concentrated in G-SIBs, mainly via repo lending to hedge funds and securities trading firms. The latest data suggest that around €432 billion, or 26%, of the €1.66 trillion of euro area banks' total exposures to NBFI entities that can be identified are to such leveraged entities.[56] G-SIBs maintain sizeable links to hedge funds, and to some extent also to

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52 Entities receiving credit from banks, be it via reverse repo transactions, or term loans and drawdowns from credit lines, are likely doing so to obtain leverage. Entities which do not use leverage from banks would not be detected in the subsequent analysis, which is based on granular bank lending and securities financing data.

53 This also includes entities from outside the euro area. Here, data availability severely limits the identification of risky non-banks, so a novel second-step identification procedure is implemented. First, all NBFI entities domiciled in Caribbean islands that have not yet been identified are classified as hedge funds. Second, the top 1,000 non-euro area non-banks by total size of exposure to euro area banks are reviewed and assigned to business models on an individual basis.

54 While some of these non-bank types may use leverage (see, for example, ESMA, 2025), this is usually constrained either by business model features or regulation (as in the case of insurance corporations and pension funds). Alternative investment funds registered in the EU may use leverage, subject to limits; the exposure to this group of funds is, with the exception of real estate funds, limited to about €4.5 billion. Other types of non-bank (e.g. money market funds) are not allowed to use leverage. These first-step sector classifications are based on AnaCredit and the sector enrichment in Lenoci and Letizia (2021).

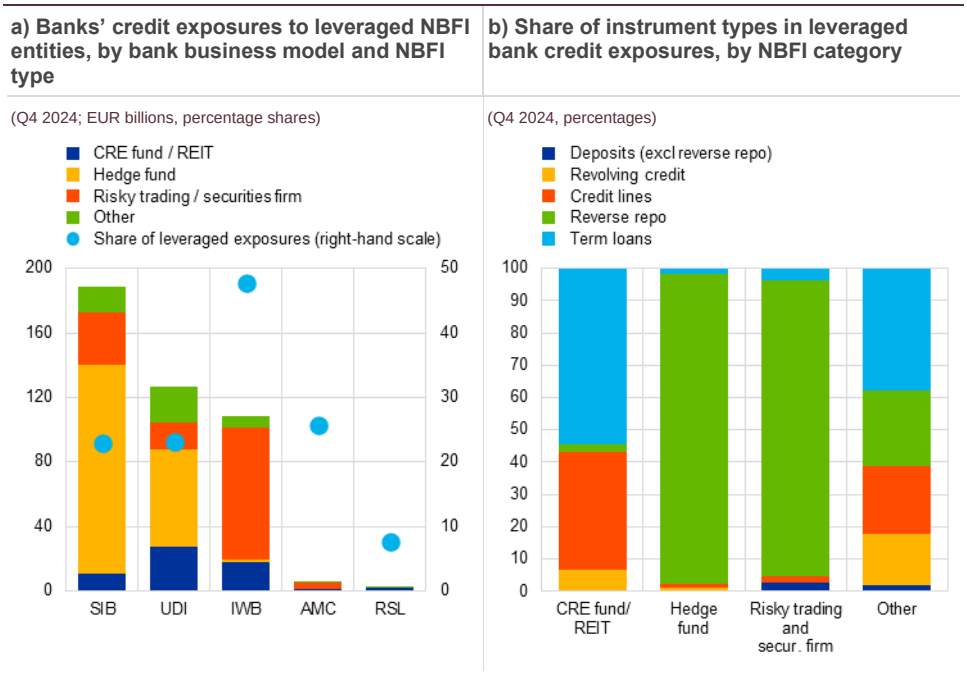
55 The analysis identifies only limited direct exposures to private finance entities, which is likely attributable to data coverage constraints rather than the absence of underlying positions. For reasons explained above, exposures are only partially captured in granular ECB datasets.

56 The two-step procedure results in a small fraction of unidentified NBFI entities, accounting for 4% of total exposure. It is likely that these contain a significant share of potentially risky exposures, most likely real estate funds, which tend to have smaller individual exposure sizes. Thus, 26% can be seen as a lower bound estimate of exposures to leveraged NBFI entities, and 30% as an upper bound. The granular data are reported by euro area-based entities only and do not include exposures of euro area banking groups booked in non-euro area subsidiaries.

trading and securities firms (**Chart 3.6**, panel a).[57] Universal and diversified lenders also account for a substantial share of leveraged NBFI exposures, but are more diversified than G-SIBs, with a notable concentration in hedge funds and substantial exposures to real estate funds and NBFI lenders. Investment banks, by contrast, are more exposed to trading and securities firms, consistent with their business model. By contrast, less complex banks engage with these entities to a much smaller extent.

Chart 3.6

Credit exposures to potentially leveraged NBFI entities



Sources: ECB (AnaCredit) and ECB calculations.
Notes: CRE stands for commercial real estate, REIT stands for real estate investment trust. The small share of deposits to NBFI entities likely reflects misreporting, including cases where certain bank subsidiaries are recorded as other financial intermediaries, and inconsistencies in the classification of instrument types. Exposures include NBFI entities which are subsidiaries of banks, with the exception of intragroup exposures. Panel a): Banks are aggregated using the business model classification developed by ECB Banking Supervision. AMC stands for asset managers and custodian banks, IWB stands for investment and wholesale banks, RSL stands for retail banks and small lenders, SIB stands for global systemically important banks, UDI stands for universal and diversified institutions. Asset managers and custodian banks operate specialised business models by investing on behalf of their clients or safeguarding their financial assets. See ECB (2021).

Linkages with hedge funds and trading and securities firms take place almost exclusively via the repo market, where banks provide very short-term collateralised funding. Hedge funds and securities firms are typically less transparent.[58] Many are highly leveraged and prone to liquidity mismatches, and exposures to them should be treated as potentially the riskiest among the group of leveraged NBFI entities. The level of leverage employed varies substantially across strategies.[59] However, hedge funds borrowing from banks via the repo market are likely among the most leveraged, as highly leveraged strategies such as relative

57 For an analysis of exposures to REITs and real estate funds, see Bierich et al. (2024).

58 A large percentage of hedge funds – particularly those based in North America and the Caribbean – do not report data to EU authorities or disclose data on their trading strategies to the public. Some hedge funds are subject to reporting requirements under the AIFM Directive; however, the data on these hedge funds could not be made available to the workstream.

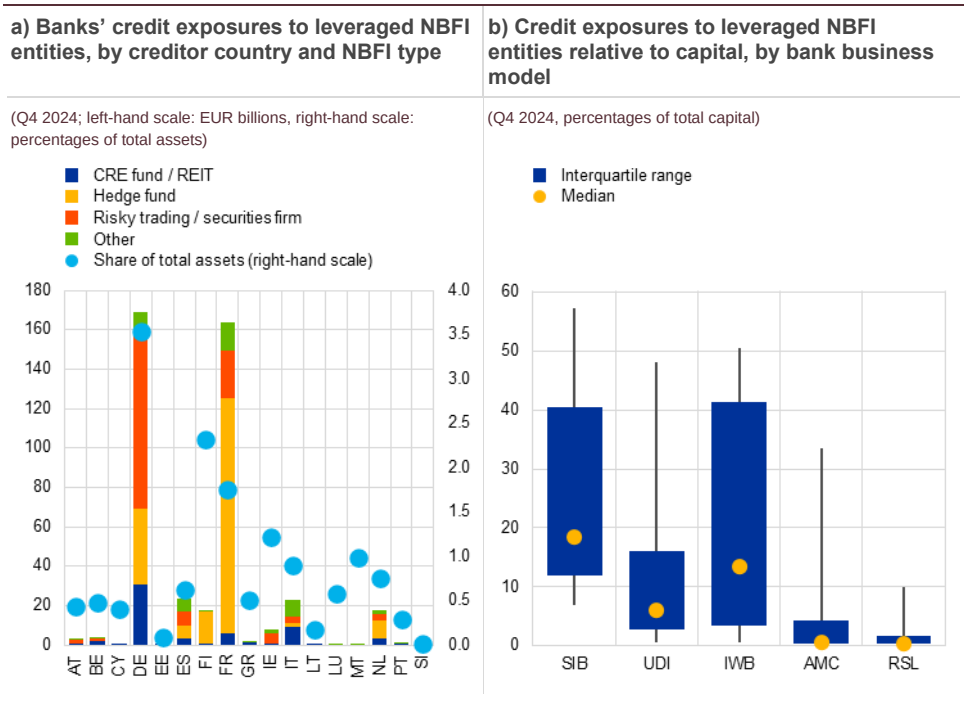
59 See, for example, the Hedge Fund Monitor of the US Office of Financial Research, which finds that macro and relative value strategies use significantly higher leverage than other hedge fund strategies.

value arbitrage often require sizeable amounts of repo funding to deliver the returns expected by hedge fund investors. Other leveraged NBFI entities tend to use a more diverse mix of bank lending instruments, such as credit lines and revolving facilities (**Chart 3.6**, panel b).

Credit exposures to potentially leveraged NBFI entities are concentrated in a few euro area banking systems and vary by size and business model composition, while remaining fairly limited overall. Most euro area bank lending to leveraged NBFI entities originates from a small number of countries, notably France, Germany, Finland and Ireland, where exposures amount to around 1-4% of total banking assets (**Chart 3.7**, panel a). These are mainly to hedge funds (for G-SIBs) and, to a lesser extent, trading and securities firms, CRE funds and REITs (for other banks). Furthermore, while the median bank's exposure is moderate for banks from most business models, some, particularly among G-SIBs and investment banks, have higher exposures relative to capital, reflecting their central role in providing leverage and liquidity to NBFI entities (**Chart 3.7**, panel b). Universal and retail lenders, by contrast, show more contained and less dispersed exposures, consistent with their more traditional intermediation role.

Chart 3.7

Credit exposures to potentially leveraged NBFI entities: business model breakdowns



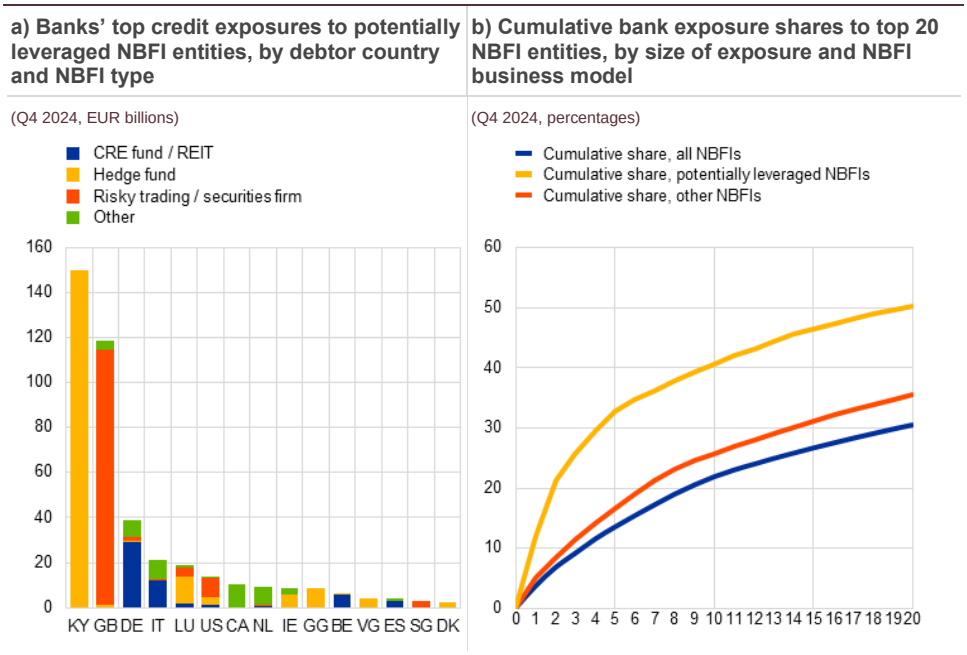
Sources: ECB (AnaCredit) and ECB calculations.
Notes: Panel a): CRE stands for commercial real estate, REIT stands for real estate investment trust. Panel b): AMC stands for asset managers and custodian banks, IBW stands for investment and wholesale banks, RSL stands for retail banks and small lenders, SIB stands for global systemically important banks, UDI stands for universal and diversified institutions. Boxes show the interquartile range, dots denote medians, whiskers span the 5th to 95th percentiles. Exposures include NBFI entities which are subsidiaries of banks, with the exception of intragroup exposures.

Leveraged NBFI credit exposures are also highly concentrated in a small number of foreign jurisdictions, with a large share linked to offshore centres. The largest exposures to leveraged NBFI entities are related to North American hedge funds domiciled in the Cayman Islands, followed by the United Kingdom,

where trading and securities firms are more prominent (**Chart 3.8**, panel a). In contrast with hedge funds, exposures to potentially leveraged CRE funds and REITs are mainly related to counterparties in the EU.[60] Leveraged exposures also appear to be highly concentrated at the NBFI entity level. The top 20 NBFI counterparties account for 30% of banks' total exposures to NBFI entities, and almost 50% when considering only potentially leveraged NBFI entities (**Chart 3.8**, panel b). Most of the top 20 NBFI counterparties are hedge funds, and to a lesser extent, trading and securities firms. These trading and securities firms are often owned by global banks.

Chart 3.8

Credit exposures to potentially leveraged NBFI entities, by geography and concentration



Sources: ECB (AnaCredit) and ECB calculations.
Notes: Panel a): CRE stands for commercial real estate, REIT stands for real estate investment trust. Exposures include NBFI entities which are subsidiaries of banks, with the exception of intragroup exposures. Country codes for non-EU and non-G7 countries: KY stands for Cayman Islands, GG stands for Guernsey, VG stands for British Virgin Islands, SG stands for Singapore.

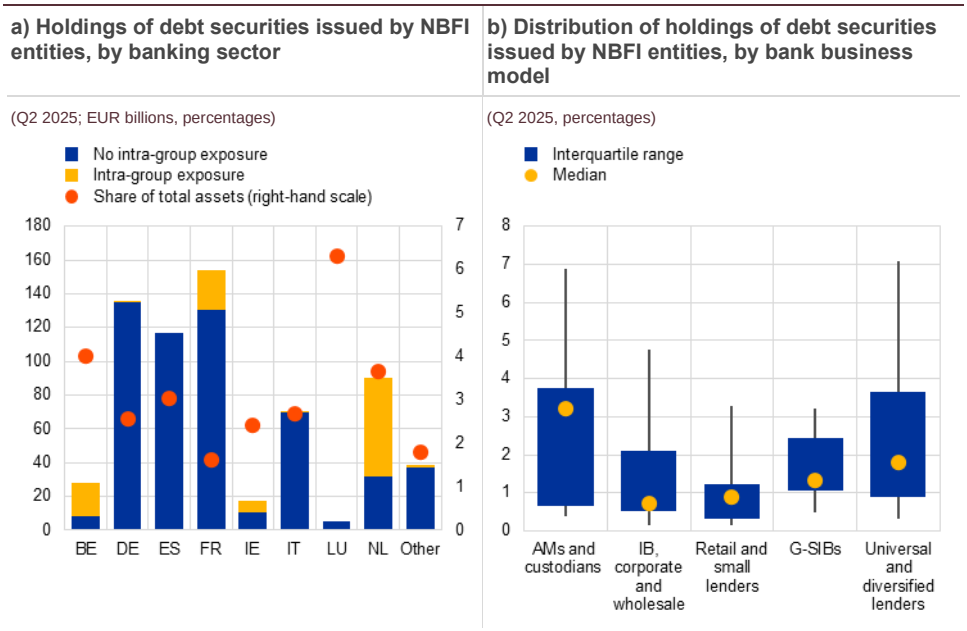
[60] However, leverage limits for real estate funds exist in certain jurisdictions, e.g. Germany.

3.2 Banks' holdings of debt securities issued by NBFI entities

Euro area banks' holdings of debt securities issued by NBFI entities are smaller than their credit exposures but display heterogeneity across bank business models and individual banks. The holdings stand at slightly above €650 billion, or about 2.5% of total assets on aggregate. Banks in Germany, France and Spain hold the largest volumes and intragroup holdings are common – especially for Dutch banks (**Chart 3.9**, panel a).[61] Asset managers and custodian banks appear to be the largest holders of NBFI debt securities relative to total assets, although with heterogeneity across banks.[62] Some banks within this group and among universal lenders hold securities issued by NBFI entities close to 10% of their total assets, with the concentration likely due to their business of managing or holding investment portfolios (**Chart 3.9**, panel b).

Chart 3.9

Bank holdings of debt securities issued by NBFI entities



Sources: ECB (SHS, CSDB) and ECB calculations.
Notes: Panel a): A significant share of Luxembourg banks' holdings consists of securities issued by European and multilateral development banks reported as OFIs. Panel b): Excludes intragroup security holdings. Boxes show the interquartile range, dots denote medians, whiskers span the 5th to 95th percentiles.

Euro area banks' holdings of NBFI debt securities are heavily concentrated in securitisation bonds, with a sizeable portion issued in dollars. These include both genuine securitisation exposures such as to US or Dutch residential mortgage-backed securities and European auto securitisations placed in the market, and also holdings of retained tranches related to banks' own origination business (**Chart 3.10**,

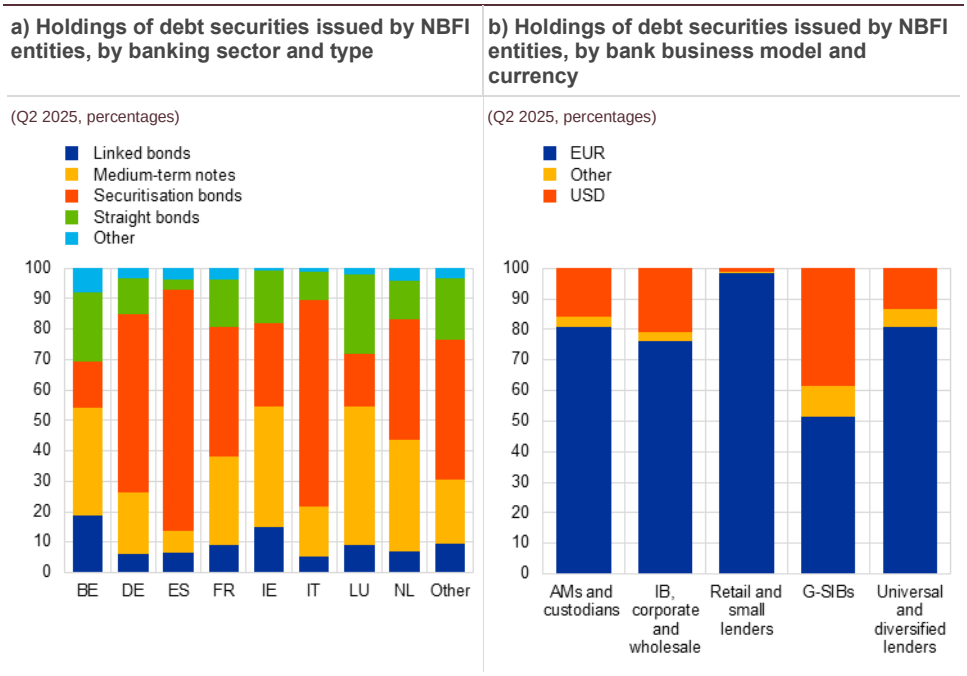
[61] Intragroup holdings are typically either (i) holdings of securities issued by (investment) banking subsidiaries or (ii) holdings of securities issued by funding vehicles falling under the prudential scope of consolidation. Intragroup holdings are removed from the subsequent analysis in this section as these will be associated with different risks than holdings of securities from extra-group issuers.

[62] Securities held in custody are not reported in the SHS dataset.

panel a). Close to 30% of bank holdings in NBFI securities are dollar-denominated, offering stable dollar income, especially given the relatively high yields on these securities; they also offer a dollar HQLA reserve providing a natural hedge for dollar-denominated liabilities (**Chart 3.10**, panel b). These NBFI-issued, dollar-denominated bonds held by euro area banks are predominantly US agency residential mortgage-backed securities. They represent low credit risk, as the underlying mortgage pools must comply with strict origination standards and the bonds can effectively be considered backed by the US Government.

Chart 3.10

Characteristics of banks' holdings of debt securities issued by NBFI entities



Source: ECB (SHS, CSDB).
Note: Both panels exclude intragroup security holdings.

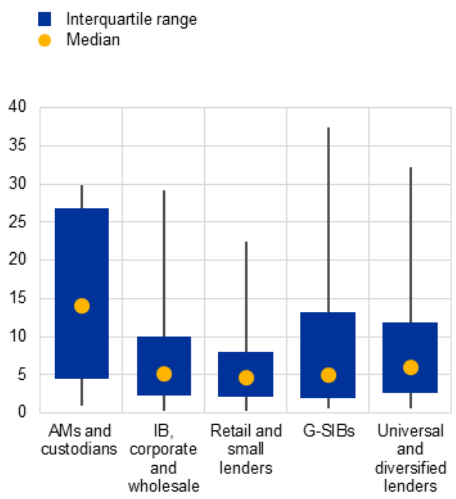
Euro area banks often hold NBFI debt securities with long maturities, exposing them to interest rate and liquidity risk. The credit risk of these holdings appears low. The securities held are typically long-term, averaging 15 years in residual maturity for G-SIBs and five years for other banks, and about 45% are held at amortised cost. The long-dated maturity exposes banks to interest rate and liquidity risk (**Chart 3.11**, panel a). The credit risk associated with banks' holdings of NBFI-issued securities seems contained, as confirmed by generally very high instrument credit ratings, although a significant portion of holdings is unrated (**Chart 3.11**, panel b).

Chart 3.11

Characteristics of banks' holdings of securities issued by NBFI entities

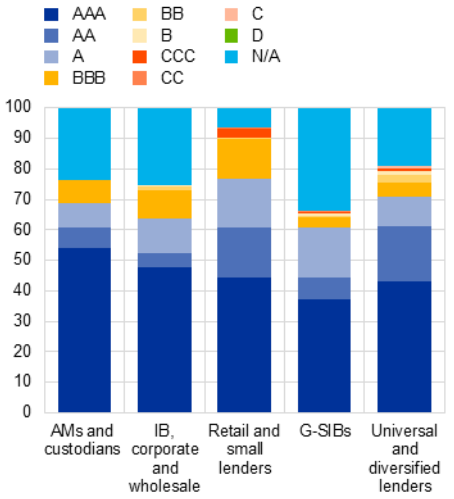
a) Residual maturity of holdings of securities issued by NBFI entities, by bank business model

(Q2 2025, years)



b) Holdings of securities issued by NBFI entities, by bank business model and rating

(Q2 2025, percentages)



Source: ECB (SHS, CSDB).
Note: Excludes intragroup security holdings.

3.3 Financial stability assessment

Banks' asset-side linkages to NBFI entities constitute a large and interconnected ecosystem, with generally low underlying credit risk, although data limitations prevent a full risk assessment. Euro area banks have significant credit exposures to various NBFI subsectors, but the lack of transparency regarding their operating structures and the extent of leverage of NBFI entities limits our ability to fully assess the risks these exposures pose to the euro area banking system. Constraints on granular reporting, which does not cover the full balance sheet of euro area banks, further limit the scope to assess the full nature and risks of credit exposures to NBFI entities. However, the data available indicate that credit risk associated with a large part of bank exposures to NBFI entities appears limited. First, a sizeable part of these exposures represents repo transactions, which are collateralised with high-quality securities and can be reduced quickly as their term is very short. Second, intragroup exposures constitute a large part of the overall credit exposure and are dominant among the exposures to the OFI sector. These are likely consolidated in the parent banking group and the underlying assets funded by these exposures are often within the perimeter of banking supervision. Nonetheless, they reduce transparency around the risk profile of the parent banking group and may give rise to commitments to support an NBFI entity in the event of distress.

Beyond credit risk, intragroup exposures, while primarily stemming from standard banking activities, could however amplify risks during periods of market stress. Intragroup structures can help optimise liquidity needs between

parent and affiliated institutions and provide long-term benefits in terms of revenue and risk diversification. However, they also carry inherent risks, such as potential contagion effects should NBFI entities experience financial distress. Furthermore, these relationships may create moral hazard concerns, as parent banks are expected to provide crisis funding during challenging times. The near-zero non-performing loan share in intragroup bank-NBFI relationships likely reflects both the procedural nature of such exposures and a possible reduction in risk monitoring by parent banks, which may anticipate stepping in with support during periods of stress.

Only a fraction of the total bank asset-side linkages with NBFI entities, which are equivalent to about 10% of total bank assets, represents interconnections with potentially leveraged entities. About a quarter of banks' total credit exposures is to potentially leveraged NBFI entities, which can be divided into two groups: those pursuing leveraged trading strategies, and those investing in illiquid long-term assets. The risks associated with interconnectedness with the first group may materialise over a very short time horizon, and could be more acute than those arising from linkages with the second.

In repo markets, euro area banks lend mainly to North American hedge funds and broker-dealers, often in US dollars. The scale of this reverse repo lending has more than doubled over the last four years. While the data do not allow a conclusive assessment of the amount of leverage used by these funds, reverse repo lending to hedge funds is likely underpinning trading strategies that build on use of leverage, such as relative value arbitrage. The reverse repo transactions are collateralised, which mitigates immediate credit and market risk. However, in the vast majority of cases they are not centrally cleared and therefore incur counterparty credit risk, depending on the quality of the NBFI and the value and volatility of the collateral. Stress test analyses show that in the event of severe asset price shocks, recognition of a deterioration in the credit quality of banks' NBFI counterparties may lead to a substantial increase in capital requirements. In this scenario, NBFI entities may also be required to post sizeable margin, as most exposures are subject to margining, usually with cash. Margining aims to mitigate counterparty risk, but can turn into liquidity risk.[63]

Some NBFI entities use credit facilities from banks such as term loans and credit lines to enhance returns on their long-term investments in real estate or originate non-bank credit. These includes CRE and other real estate funds, private equity and private credit funds, as well as non-bank lenders providing loans and leasing services to the real economy. As bank exposures are senior to equity in these NBFI entities, credit risk is usually limited, but given the illiquid and long-term nature of the assets held, some credit losses cannot be ruled out.

Banks' exposures are usually well diversified, mitigating idiosyncratic risk from the possible failures of singular NBFI but creating a substitutability problem for NBFI entities. This particularly applies in the reverse repo market, where a limited number of banks provide the bulk of reverse repo funding to NBFI

[63] For an analysis of counterparty credit risk and contagion via counterparty defaults, see Barbieri et al. (2025).

entities, often interacting with several hundred counterparties. Such a high degree of concentration raises substitutability issues, which could trigger or amplify financial shocks if one of these key banks were unable to continue operations. Additionally, some bank business models, such as those of asset managers and custodian banks, show concentrated holdings of NBFI securities; this could expose them to heightened interest rate and liquidity risks in an uncertain economic environment.

Banks' significant exposures to non-euro area NBFI entities and in non-euro-denominated assets could act as a mechanism for spillovers during periods of global market uncertainty. Financial market volatility, including sharp exchange rate movements, can directly impact the value of these exposures and the related income streams. The interconnectedness of international NBFI entities with global financial markets can amplify vulnerabilities, with sharp market adjustments or distress in foreign NBFI entities creating spillover effects on euro area banks. Additionally, non-euro-denominated lending introduces liquidity risks, as banks may face challenges in rolling over non-euro funding or securing foreign currency liquidity during periods of market dislocation, potentially straining their balance sheets and limiting their ability to meet short-term obligations.

The short-term collateralised nature of bank lending to leveraged NBFI entities may amplify market stress. Banks may proactively reduce their lending to NBFI entities and issue margin calls to them to protect their own balance sheets or raise the cash needed to meet outflows of short-term repo funding. This could be especially concerning where NBFI counterparties are borrowing from banks to fund leveraged positions in long-term assets whose liquidity may be impaired during stress, and when entities follow crowded trades. Procyclical bank reactions could trigger and amplify liquidity strains in the NBFI sector, as it depends on bank finance and has no other sources of contingent funding. Retrenchment of the provision of leverage to NBFI entities could further amplify asset price swings, as leveraged entities may have to unwind some of their portfolios to meet margin calls.

4 Banks' derivatives exposures to NBFI entities

4.1 Linkages between banks and NBFI entities in derivatives markets

NBFI entities trade derivatives with banks to hedge financial risk and take synthetic positions in financial assets. Over the past two years the gross notional derivatives exposures of euro area banks with NBFI entities have risen significantly, increasing from €28 trillion to €42 trillion, equivalent to about a quarter of the total. This growth not only reflects the overall expansion of the derivatives market, it also highlights the rising share of transactions involving NBFI entities. Interest rate contracts account for more than half of total gross positions.[64] NBFI entities also actively trade currency forwards and equity options with banks (**Chart 4.1**, panel a). By contrast, commodity and credit derivatives represent a marginal share of the trading volume. Credit derivatives are mainly employed by bond funds to mitigate exposures to sovereign and corporate bonds.[65] Commodity derivatives are primarily utilised by the financial arms of energy companies to hedge risks associated with their commodity businesses.[66]

Among NBFI entities, IFs and OFIs play a dominant role in derivatives trading with euro area banks. The breakdown of derivatives positions by NBFI sector reveals a clear segmentation based on business model and domicile. Trades with IFs predominantly involve counterparties based in the Cayman Islands, which may include hedge funds using derivatives to generate synthetic leverage, such as for basis trades.[67] Derivatives trades with OFIs, the second-largest NBFI counterparty sector in the derivatives market, primarily involve counterparties domiciled in the euro area or other major economies such as the United Kingdom, United States and Japan. For insurance corporations and pension funds, transactions are largely conducted with euro area or European entities located in countries where these types of entities are headquartered (**Chart 4.1**, panel b).

Banks take sizeable net positions in interest rate derivatives to hedge risks in the banking book, with NBFI entities on the opposite side of the trade. Net notional exposures, which represent open positions between banks and NBFI entities,[68] show that banks transfer interest rate risk to the NBFI sector with opposite

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64 Derivatives positions reported using gross notional values serve as a proxy for the scale of derivatives activity between banks and NBFI entities. However, these figures do not accurately reflect the true risk exposures. Furthermore, the higher the market-making activity, the more these figures tend to appear overstated, as they capture the volume of transactions rather than the underlying net risk.

65 The limited use of credit derivatives can be mainly attributed to two key factors: the high proportion of compressed contracts within this market and declining reliance on these instruments for credit risk hedging purposes.

66 See Furtuna et al. (2022).

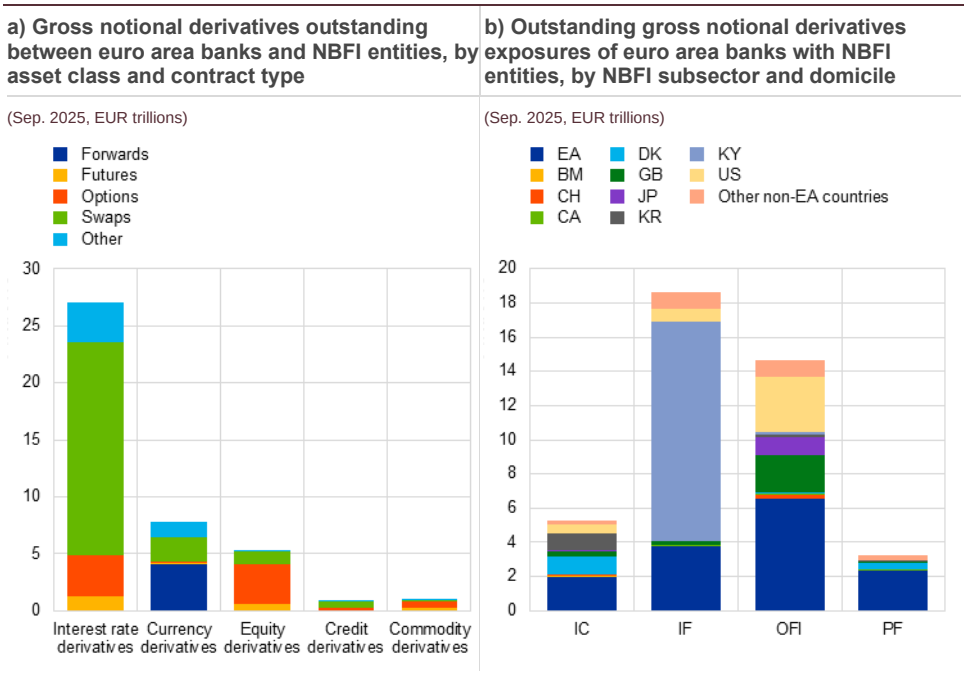
67 See Bassi et al. (2024).

68 Net notional exposures account for offsetting trades on the same underlying asset.

hedging needs. For example, banks with a positive duration gap can hedge their exposures by taking positions in interest rate swaps as net buyers, while NBFI entities with a negative duration gap can hedge their exposures by acting as net sellers.[69] Net exposures are notably smaller than gross notional positions for equity and commodity derivatives (**Chart 4.2**, panel a). For these asset classes, banks mostly provide access to clearing services and make markets in derivatives traded over the counter. For example, banks operate matched books in equity derivatives by netting opposite exposures across different counterparties.

Chart 4.1

Derivatives positions between euro area banks and NBFI entities reflect the derivatives landscape and the scale of NBFI sectors



Sources: ECB (EMIR) and ECB calculations.
Notes: The analysis is based on a sample of euro area banks directly supervised by the ECB and active in the euro area derivatives market which have derivatives positions outstanding with NBFI entities. Panel b): IC stands for insurance corporations, IF stands for investment funds and money market mutual funds, OFIs stands for other financial intermediaries, PF stands for pension funds. Country abbreviations for non-EU and non-G7 countries: KY stands for Cayman Islands, BM stands for Bermuda, CH stands for Switzerland, KR stands for Republic of Korea. EMIR sector classification based on Lenoci and Letizia (2021).

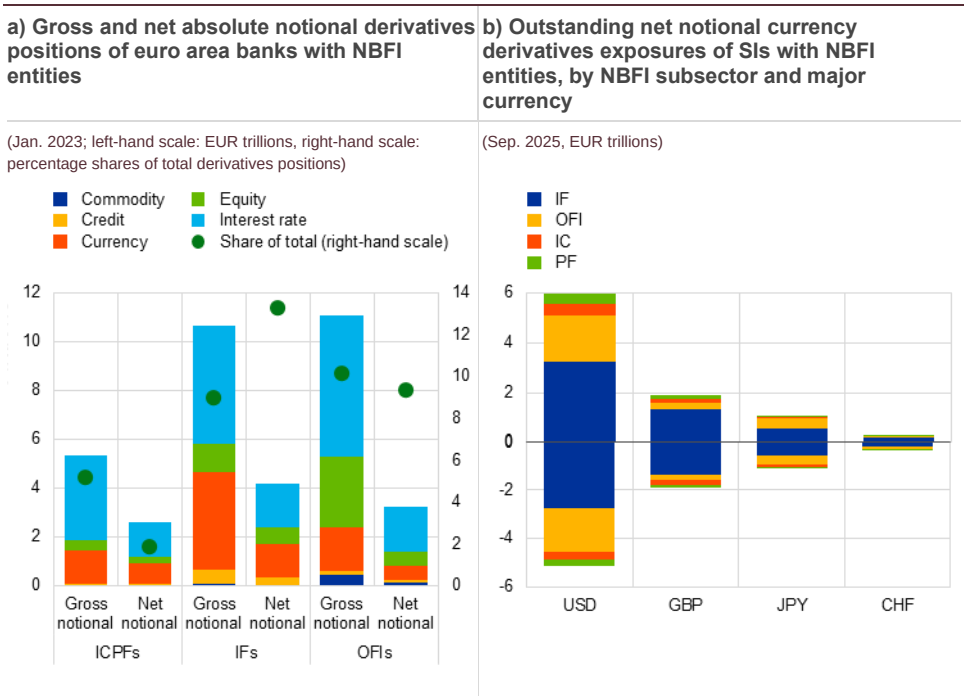
In the cross-currency IRS and FX markets, banks act as intermediaries in derivatives trading, providing dollars to NBFI entities and maintaining matched books in other major currencies. Net notional positions in cross-currency interest rate swaps and FX derivatives show that NBFI entities mainly trade with banks to exchange dollars for euro or vice versa. On aggregate, NBFI entities are committed to receive a net amount of nearly €1 trillion-worth of US dollars from banks over the lifetime of these contracts. A material part of this net value represents foreign exchange and US interest rate risk hedging by European investors such as pension funds and insurers, whose liabilities are denominated in euro or who offer their customers currency-hedged investments in US assets. Derivatives contracts involving the pound sterling, the Japanese yen and the Swiss franc are less

[69] See Grassi et al (2022).

significant for hedging or speculation. Across these major currencies, banks maintain broadly matched books, with limited net exposures (**Chart 4.2**, panel b).

Chart 4.2

Banks provide access to clearing services for NBFI entities and make the market in derivatives traded over the counter



Sources: ECB (EMIR) and ECB calculations.
Notes: The analysis is based on a sample of 95 euro area banks directly supervised by the ECB and active in the euro area derivatives market which have outstanding derivative positions with NBFI entities. ICPFs stands for insurance corporations and pension funds, IF stands for investment funds and money market mutual funds, OFIs stands for other financial intermediaries. Panel a): Net notional is calculated at counterparty, asset class, contract type and clearing level, and absolute values are aggregated at NBFI sector and asset class levels. Originally published in Franceschi et al. (2023). Panel b): Net notional is computed at SI parent level taking into account offsetting positions for intragroup trades. Net buying and net selling positions of different banks are not offset against each other. Positive (negative) values indicate banks which are receivers (payers) in the corresponding foreign currency against the euro. EMIR sector classification based on Lenoci and Letizia (2021).

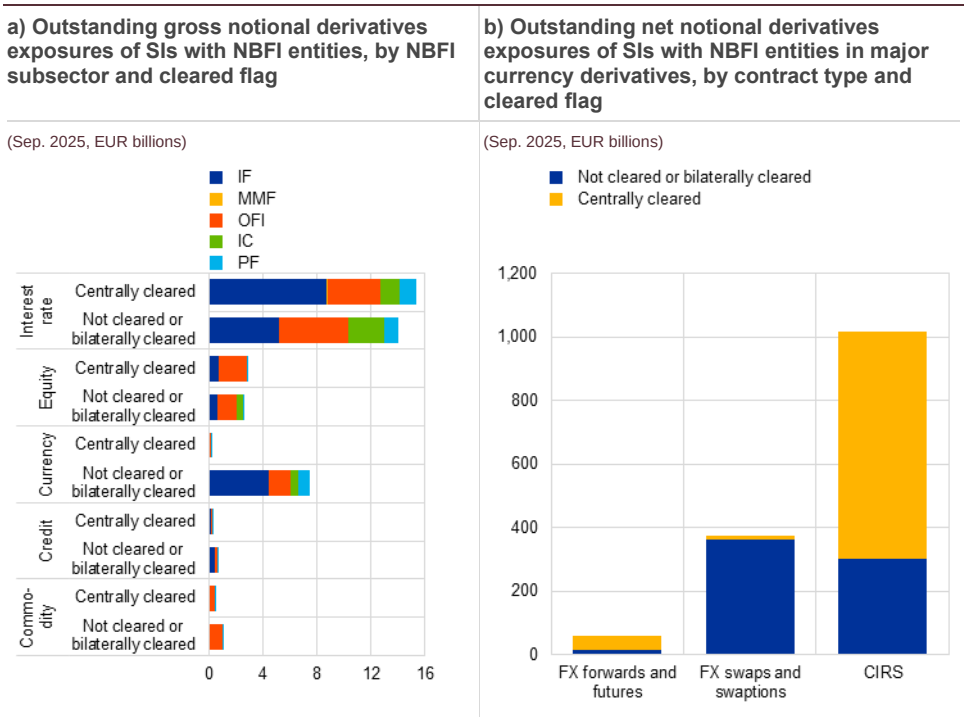
The nature of the risks associated with derivatives trades for banks depends also on whether the trades are cleared or not. Some standardised derivatives are subject to mandatory central clearing through central counterparties (CCPs). For these, and other derivatives not subject to mandatory central clearing, banks may opt for bilateral clearing arrangements. When contracts are centrally cleared, banks face step-in liquidity risks. This occurs when NBFI counterparties fail to meet margin calls, requiring banks which act as clearing members of the CCP to “step in” and provide liquidity on their behalf. A significant portion of interest rate derivatives contracts are centrally cleared. On the other hand, for uncleared contracts, banks primarily face counterparty credit risk. This is particularly relevant for foreign exchange derivatives, which exhibit a high proportion of contracts that are not cleared through CCPs (**Chart 4.3**).

A small group of large systemically important banks in the euro area is central to the functioning of the derivatives market, even though they only take limited directional positions. Banks facilitate market access for NBFI entities by acting as

clearing members, market-makers or natural counterparties.[70] Only those with the requisite scale, balance sheet capacity and expertise to maintain a matched book and manage associated market and liquidity risks are typically active here. In the euro area, 76% of the gross notional outstanding with NBFI entities is intermediated by systemically important banks[71] (**Chart 4.4,** panel a).

Chart 4.3

Cleared derivatives positions might give rise to step-in liquidity risk and counterparty credit risk



Sources: ECB (ECB 2023, EMIR) and ECB calculations.
Notes: The analysis is based on a sample of euro area banks directly supervised by the ECB and active in the euro area derivatives market which have outstanding derivative positions with NBFI entities. Net notional is calculated at counterparty, asset class, contract type and clearing level, and absolute values are aggregated at NBFI sector and asset class levels. EMIR sector classification is based on Lenoci and Letizia (2021). Panel b): Net notional positions include cross-currency interest rate swaps and FX derivatives in USD, GBP, JPY and CHF. CIRS stands for cross-currency interest rate swaps.

This concentration is not only a result of the characteristics of banks' business models – it is also limited to a small number of banks. 80% of the outstanding notional for derivatives traded by NBFI entities in the euro area is intermediated by ten banks, mainly domiciled in France or Germany or subsidiaries of non-euro area banks. The degree of concentration is even higher in smaller and more specialised derivatives markets. For instance, in commodity and credit derivatives trading the three largest banks intermediate over 75% of all trades with NBFI entities. However, the top banks within each cluster differ across asset classes (**Chart 4.4,** panel b).

70 Usually, NBFI entities do not act as clearing members in the derivatives market and use banks to access CCPs. In markets not subject to central clearing, banks often intermediate customer trades, taking offsetting positions with NBFI counterparties.

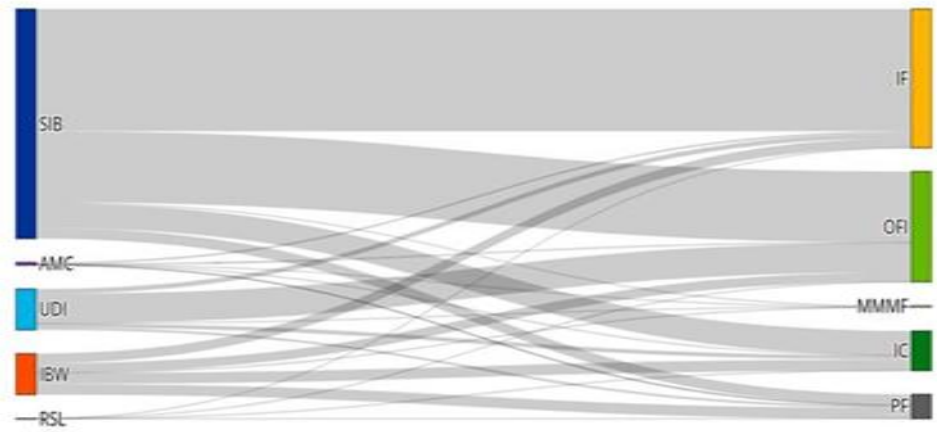
71 For the definition of global systemically important banks, see footnote 8.

Chart 4.4

Derivatives trading with NBFI entities is concentrated in a few large systemic banks

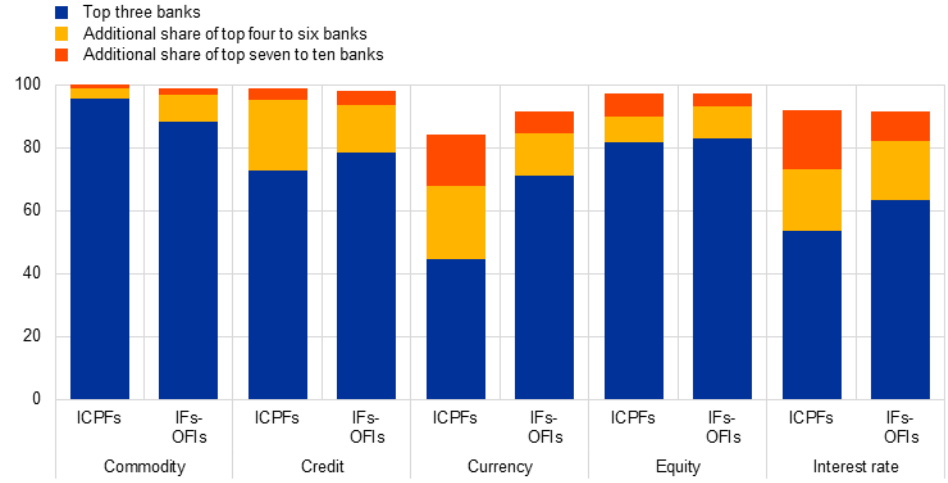
a) Outstanding gross notional derivatives exposures of SIs with NBFI entities, by bank business model and NBFI subsector

(Sep. 2025, share of total GNV)



b) Concentration in euro area banks' derivatives exposures to NBFI entities, by NBFI entity type and asset class

(Jan. 2023, percentage shares of GNV outstanding)



Sources: ECB (ECB 2023, EMIR) and ECB calculations.
Notes: The analysis is based on a sample of 95 euro area banks directly supervised by the ECB and active in the euro area derivatives market which have outstanding derivative positions with NBFI entities. GNV stands for gross notional value, ICPFs stands for insurance corporations and pension funds, IFs stands for investment funds and money market mutual funds, OFIs stands for other financial intermediaries. Net notional is calculated at counterparty, asset class, contract type and clearing level, and absolute values are aggregated at NBFI sector and asset class levels. EMIR sector classification based on Lenoci and Letizia (2021). Panel b): Originally published in Franceschi et al. (2023).

4.2 Financial stability assessment

The risks arising from bank-NBFI linkages in the derivatives market can be broadly categorised into two types: risks that banks pose to NBFI entities and risks that NBFI entities pose to banks. The high concentration and specialisation of banks in this market raise concerns about substitutability, and consequently the

ability to provide euro area and global NBFI entities with access to the euro area derivatives market. These activities often require banks to act as clearing members of central counterparties (CCPs), deposit default fund contributions at CCPs, develop robust margining models for both bilateral and OTC derivatives contracts subject to mandatory clearing, and implement comprehensive risk management frameworks to address the market risk associated with the underlying assets and the counterparty credit risk posed by NBFI entities.

Therefore, as already noted for other types of bank-NBFI linkages, the limited substitutability of key banks presents a significant concern, as they play a critical role in ensuring the smooth functioning of the derivatives market with NBFI entities. If one or more of these institutions were to encounter distress, it could severely disrupt the ability of some NBFI entities to hedge their exposures, operate effectively, or manage liquidity and market risks. Moreover, as evidenced by recent episodes, distress within the NBFI sector could propagate back to these key banks, potentially triggering spillovers to other banks or NBFI entities, given their elevated levels of interconnectedness and exposures, and even to the broader real economy.

Initial and variation margins are crucial tools for banks to mitigate the market, liquidity and counterparty credit risks stemming from derivatives exposures, but may amplify systemic stress. However, asset price shocks – whether affecting the underlying assets or the collateral – can lead to challenges that extend beyond the scope of margin protection. Furthermore, margining practices still expose banks to step-in liquidity risk. This arises when NBFI clients are unable to meet margin calls, requiring banks to step in and provide liquidity, particularly following abrupt market movements. These margin calls can place significant strain on NBFI entities, potentially triggering funding outflows at banks, increasing usage of contingent facilities and creating spillover effects that further impact banks and the broader financial system. In recent episodes such as the turmoil in the UK gilt market, sudden price fluctuations in safe assets used by NBFI entities as collateral triggered spillover effects between the derivatives and repo markets, exposing banks to reduced collateral values and heightened counterparty credit risks across multiple markets.

5 Data gaps and limitations

The analysis presented in this report has been constrained by two types of data gap. First, gaps resulting from limitations of existing data collections, where data are simply not collected. Second, access gaps, where data exist but are not shareable or readily linkable across different jurisdictions or authorities. Some information essential to understanding bank-NBFI linkages is not collected at all, neither at the EU or euro area level nor within individual jurisdictions. In part this reflects the lighter reporting scope for NBFI entities. **Section 5.1** presents these gaps in detail. Even where relevant NBFI data do exist within the European System of Financial Supervision, differences in the mandates of authorities limit the ability to develop a standardised, centralised repository. As a result, data remain fragmented and cannot be combined into a consolidated view (see **Section 5.2**). This workstream has focused on the data gaps which constrained its analysis, and acknowledges that other data gaps may be present which are of less acute importance for the understanding of bank-NBFI linkages.

Some of the limitations affecting the analysis of NBFI entities have recently been acknowledged by the ESRB and the Financial Stability Board (FSB). The ESRB has emphasised that authorities need more comprehensive and better-quality data, easier access to data, and adequate resources to analyse data in order to address risks and vulnerabilities in the NBFI sector.[72] The FSB has established a dedicated task force to address data gaps related to NBFI entities. This aims to enhance the capacity of FSB member authorities to identify and assess vulnerabilities arising from NBFI sectors, strengthen their ability to evaluate and tailor policies to mitigate financial stability risks, and explore mechanisms for information and data sharing among authorities to address significant threats to global financial stability.[73]

5.1 Data gaps resulting from limitations of existing data collections

The most acute data gap is the limited availability of data on the balance sheets and financial risks of certain NBFI entities, making the assessment of risk arising from bank exposures to them difficult. Many NBFI entities are domiciled outside the EU, so EU authorities cannot obtain supervisory or statistical data. Furthermore, for several NBFI types (especially EU-based OFIs and most non-EU-based entities, including hedge funds, private equity and private credit funds),[74]

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72 See ESRB (2024b).

73 The FSB established the Nonbank Data Task Force (NDTF) to address critical data challenges related to non-bank financial intermediation sectors. The NDTF aims to enhance the identification and assessment of vulnerabilities, improve the calibration of policy responses, and explore information sharing mechanisms to mitigate significant financial stability risks. See FSB (2025).

74 Some of these entities are subject to reporting obligations under the AIFM Directive, if they are based in the EU or marketed in the EU.

the level and sources of leverage cannot be computed from existing data. These entities often do not even disclose public financial accounts. As a result, it is very difficult to accurately assess how risky individual exposures to NBFI entities are. In turn, the assessment of financial stability risks arising from bank-NBFI interconnections at the level of the EU or the euro area needs to rely on simplifying, often generic assumptions.

Some information on performance and risk exposures of NBFI entities may be accessible from commercial sources, but these data are often insufficiently comprehensive and granular. Specialised commercial data providers collect data on specific NBFI subsectors; however, the perimeters, scope and frequency of reporting are determined by each provider.[75] The voluntary reporting mechanisms and best-effort approaches these providers often rely on can introduce biases, particularly in terms of comprehensiveness.

Some granular data on NBFI holdings of and transactions in financial assets are collected, but these face geographic limitations and identification challenges.

- **There is no comprehensive register for leveraged NBFI entities and no leverage data for most NBFI entities.** Beyond the absence of an EU-wide register, for several NBFI types (especially EU-based OFIs and most non-EU-based entities) the level and sources of leverage cannot be computed from existing data. This implies that identification mostly occurs at entity level, based on the sector or business model, rather than being determined by activity-based metrics such as leverage ratios. Therefore the data gap hampers the ability to monitor and assess the activities, interconnectedness and potential risks these entities pose to the broader financial system, and to euro area banks more specifically.

- **The Securities Holdings Statistics (SHS) dataset includes data on securities held by euro area NBFI entities, but does not provide sufficiently granular information on holdings by non-euro area entities.** It allows users to analyse the holdings of euro area bank bonds and bank shares by holding sector and country of domicile, including those held by NBFI entities domiciled within the euro area (see, for example, the analysis in **Sections 2.4** and **3.2**). However, for non-euro area holdings, the dataset does not provide a sectoral or country breakdown. This limitation creates gaps in the ability to assess critical information, such as the share of euro area bank bonds held by global NBFI entities and the concentration of such holdings in specific countries and sectors.

- **Existing regulations on financial transaction reporting and credit registers lack harmonisation on the depth of collateral-related information to be reported.** For instance, in the case of derivative transactions, counterparties

[75] Lipper Global Data Feed and Morningstar cover data on investment funds. EPFR can be either aggregated for all investment funds or at the individual fund or share class level, and includes investment fund assets under management and flows into different types of investment categories. Orbis covers data on insurance corporations and pension funds, while Preqin covers data on private credit and private equity funds.

are not obliged to report collateral data to meet initial margins. By contrast, for securities financing transactions and the credit register, collateral information is required at the ISIN level. Therefore, while granular data capture collateral flows, albeit with some outstanding data quality issues, they do not give a full view of rehypothecation of collateral. These limitations may constrain the assessment of risks to banks and NBFI entities from margin calls, securities financing transactions and shifts in market prices.[76]

- **The lack of a comprehensive public register on the global group structures of NBFI entities creates significant gaps in understanding how they are interconnected with and exposed to banks.** To the best of our knowledge, there is no publicly available register that provides comprehensive information on the global group structures of NBFI entities, particularly across sectors. At the global level, some partial information can be obtained through the Global Legal Entity Identifier Foundation (GLEIF). For euro area entities, the ECB relies on the Register of Institutions and Affiliates Database (RIAD); however, even this provides only limited information – especially when subsidiaries are domiciled outside the euro area. Commercial data providers such as Lipper are useful for obtaining insights on investment funds, but significant gaps remain due to the voluntary nature of the data collection. These data limitations have several implications. For example, they only allow for a partial estimation of banks' concentration of exposures to NBFI entities, whether in the form of funding received from NBFI entities or lending provided to them. Furthermore, they do not enable an assessment of whether NBFI entities manage matched positions at the group level across their subsidiaries. If a harmonised LEI-based group structure with a mandatory intragroup flag were available across datasets, the workstream could measure consolidated exposures and contagion with greater accuracy.

- **Challenges in identifying subsector classification for OFIs.** This is a broad classification that can encompass a wide range of NBFI entities with varying levels of risk, such as captive financial institutions, financial auxiliaries and securitisation vehicles. Granular data collections usually do not require reporting agents to identify an OFI as belonging to a specific type. This lack of granularity makes it challenging to differentiate between institutions within the category and assess their unique risk profiles and potential contributions to financial stability vulnerabilities. In a similar vein, identification of NBFI entities pursuing a specific business strategy – such as private credit funds or hedge funds – relies on commercial data sources and may not be accurate.

The granular data reported by euro area banks provide a good overview of the sector's exposure to NBFI entities, but are limited in terms of geographic perimeter and suffer from weaknesses in identification and classification of NBFI entities in risk assessment.

- **Granular data on exposures to NBFI entities by non-euro area subsidiaries of euro area banks are not available.** This gap has several

[76] This data gap affects transactions carried out by both banks and NBFI entities.

important implications, not least because it concerns two significant markets in which euro area banks trade with NBFI entities: derivatives and repos. First, it hinders the ability to evaluate whether large euro area banks are operating matched books for certain exposures or with specific NBFI counterparties across their euro area parent entities and global subsidiaries. Consequently, it becomes challenging to obtain a comprehensive assessment of both matched and directional positions. Second, this limitation complicates risk assessments for such exposures. For example, it may be difficult to analyse the concentration or potential volatility associated with NBFI entities borrowing through a US subsidiary of a euro area bank.

- **Indirect interconnections via co-lending and private capital chains are not captured.** Beyond direct counterparty links, bank-NBFI interconnections also arise indirectly when banks and investment funds co-finance privately held firms. Lenders may have no direct bilateral relationship under such structures, so it may not be possible to identify that they are co-financing the same borrower. If finance is provided via special-purpose entities, it may not be possible to identify the ultimate borrower from the datasets available. This makes such financing chains difficult or even impossible to monitor.

Timely risk assessment is constrained by the low frequency of reporting, as many supervisory and holdings datasets are only available quarterly. Except for the granular databases (AnaCredit, EMIR and SFTR), most supervisory and holdings datasets are quarterly (e.g. many Solvency II QRTs, supervisory reports and SHS). Monthly frequency would allow a more regular assessment of risks from bank-NBFI interlinkages, particularly around stress episodes. Authorities receive daily counterparty-level transaction data for derivatives and SFTs thanks to EMIR and SFTR, yet holdings data provide sector- and country-level detail only for euro area counterparties, paradoxically leaving the trades granular but the underlying positions opaque and reported with a long lag.

5.2 Data gaps resulting from restricted access to existing data and insufficient data quality

The fragmented access to relevant data makes it impossible to join up NBFI data with the relevant banking data for a complete picture of the risks arising from bank-NBFI interconnections. Fragmentation constraints the analysis in several ways:

- **Risk metrics of NBFI entities are reported to competent authorities and available to a limited group of authorities.** In the EU, this reporting is carried

out under the AIFM Directive (AIFMD)[77] and the UCITS Directive[78] (for investment funds), the MMF Regulation[79] (for money market funds), Solvency II[80] (for insurers), MiFID/MiFIR[81] and EMIR[82]. These data include balance sheet items as well as risk metrics, both of which could shed further light on the riskiness of bank exposures to EU-based NBFI entities. However, there is no centralised data access and sharing mechanism in place. [83]

- **Granular data on some NBFI holdings of bank bonds is only available to ESAs and national authorities.** For instance, EIOPA has access to detailed securities holdings of insurance corporations, while ESMA can access fund-level data but not granular holdings of investment funds. Enhanced data sharing arrangements across jurisdictions and institutions would therefore be highly desirable to address these information gaps. In several jurisdictions, granular data on entity-level security and deposit holdings exist at NCAs/NCBs for domestic entities, significantly improving the visibility of banks' funding from domestic NBFI entities. The ESCB also maintains an extensive register of all the securities likely to be held by EU investors, but access to this data by NCAs or ESAs is not possible.

If national, ECB and ESA data could be linked, then the key questions on funding could be addressed without new reporting.

Further limitations to the analysis of bank-NBFI linkages are related to quality issues affecting granular datasets:

- **Sectoral classification in granular datasets is carried out by the reporting agents and often leads to inconsistencies.** Reporting banks often misclassify their sector or that of their NBFI counterparties, or do not provide a sectoral classification at all. Enriching granular data such as AnaCredit, EMIR, SFTDS and SHS with sectoral classification requires time-consuming and complex work, relying on a range of public registries and commercial providers. It also requires assumptions, and conflicting entries provided by reporting agents have to be reconciled.

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77 Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010.

78 Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS).

79 Regulation (EU) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds.

80 Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance.

81 Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU, and Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012.

82 Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.

83 For more information on the data gaps and availability constraints related to NBFI data, see FSC high level task force on non-bank financial intermediation (NBFI) (2024).

- **Incomplete identification of intragroup exposures within financial conglomerates poses significant risks to accurate risk assessment.** Although data on NBFI group structures are available to some extent for EU groups – unlike for non-EU NBFI entities – they suffer from shortcomings. First, information on the NBFI subsidiaries of euro area banks and bank subsidiaries of NBFI entities is not complete. Second, the intragroup field is not consistently subject to mandatory reporting across different granular data reporting frameworks. These limitations can result in incomplete or potentially biased conclusions about intragroup risk dynamics.

5.3 Policy implications

Data gaps constrained the ability of the workstream to assess the systemic risk arising from bank-NBFI linkages. Our analysis draws on merged banking and transaction-level data for the euro area available to the ECB, as well as on data available to EIOPA and some national authorities. Access to granular data on NBFI securities holdings and the leverage of regulated EU-based NBFI entities would have allowed for more refined and detailed analysis, without requiring any new data collections to be made. Closing these gaps would deliver a more timely, system-wide view of bank-NBFI interlinkages, and in turn contribute to a more accurate and detailed assessment of systemic risk.

To improve the assessment of systemic risk arising from bank-NBFI linkages, better information sharing to address the gaps identified should be prioritised in line with the proposals put forward by the FSC high-level task force (HLTF) on non-bank financial intermediation.[84] Given the focus the EU is placing on reducing burdens, the immediate low-hanging fruit of full access, linkage and harmonisation of the datasets already collected should be harvested before any new reporting is considered. The following actions could reduce the impact of data gaps on financial stability assessments; these actions are critically important to assessing bank-NBFI linkages:

- Targeted legislative changes to data access and sharing provisions in the relevant EU regulations to enable timely and efficient exchange of NBFI statistical and regulatory data among central banks and supervisory authorities;
- A centralised data access and sharing mechanism, while maintaining direct data collection from NBFI entities at the national level;
- Targeted legislative changes to mandate the use of internationally recognised identifiers in reporting;

[84] This task force was set up by the Eurosystem's Financial Stability Committee in December 2023 to coordinate positions on policies to address leverage-related risks in the NBFI sector and margin preparedness, identify gaps in the policy toolkit to address risks in NBFI entities from a macroprudential perspective and develop additional policy measures and assessing the institutional set-up in implementing them. See FSC high level task force on non-bank financial intermediation (NBFI) (2024).

- Amending ESMA guidelines on AIFMD reporting obligations to introduce a specific AIF type dedicated to private credit funds.

Major gaps as regards the interlinkages between banks and non-EU NBFI entities are likely to remain even if the proposals from the HLTF are fully implemented. Non-EU-based entities are generally not subject to reporting requirements in the EU, while they constitute an important part of the NBFI entities interacting with EU banks. This blind spot could only be addressed through a coordinated global initiative, which appears unlikely to be successful at the current juncture.

Annex A: Boxes

Box 1
Investment fund deposits at banks in Luxembourg

Prepared by Max Gehrend (Commission de Surveillance du Secteur Financier, Luxembourg)

The banking sector in Luxembourg is characterised by important linkages with NBFI entities, in line with the composition of the country's financial sector. One-third of the liabilities of banks in Luxembourg come from NBFI entities, half of them deposits from funds. These linkages are a reflection of the country's large NBFI sector, which accounts for 93% of the local financial sector's assets.

Luxembourg also hosts a large number of custodian banks to service its investment fund sector, including by offering cash accounts for funds. As of December 2024, Luxembourg was home to 28 custodian banks with aggregate total assets of €297 billion and more than €9 trillion in assets under custody. The presence of custodian banks in Luxembourg is partly due to the legal obligation for investment fund managers to appoint a depositary that either has its registered office in Luxembourg, or has a branch in Luxembourg if its registered office is in another EU Member State.[85] Investment funds not only keep their financial instruments in custody at local banks, they also hold around half their deposits at local banks. Deposits held by investment funds alone account for 15% or €146 billion of Luxembourg banks' total liabilities; most of these are held at custodian banks (€122 billion).

Under stressed market conditions investment funds tend to increase the share of deposits in their portfolios, reflecting a flight-to-safety response. As shown in Chart A.1, in past crises managers reallocated part of funds' assets from securities to deposits, with a view to de-risking their portfolios and building up precautionary cash buffers.[86] Funds' aggregate ratio of deposits to net assets has also tended to decrease over time due to structural changes. The sector's composition has shifted significantly from fund types that structurally hold more deposits, such as money market funds, to equity funds, which tend to hold less cash.

The increase in the portfolio share of deposits under stress is driven by active decisions taken by fund managers, not merely by changes in portfolio valuations. If asset prices decline, the value of the securities held by investment funds decreases, while the value of deposits remains constant. As a result, the share of deposits to net assets increases mechanically. However, the increase in the ratio of deposits to net assets in Chart A.1 is not only driven by such valuation effects, but also by managers' active decision to increase the absolute amount of deposits held at banks via asset sales, as shown in Chart A.2. This reflects the dash-for-cash that occurred in March 2020. While the negative effect of asset sales by funds on market prices

[85] Article 17(2) of the Law of 17 December 2010 relating to UCI and Article 19(3) of the Law of 12 July 2013 on AIFMs.

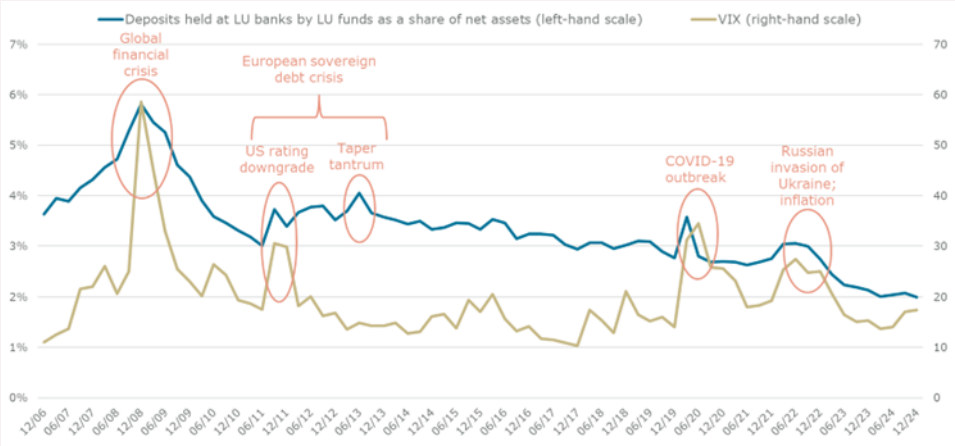
[86] This is consistent with findings from the literature reported by, for example, Claessens and Lewrick (2021), Morris et al. (2017), Schrimpf et al. (2021) and Böhl and Goergen in Box 4 of ESRB (2025b).

has been widely discussed, the flip side of this behaviour, i.e. increased funding by funds to banks via deposit inflows, has generally received less attention.

Chart A.1

Deposits held at Luxembourg banks by Luxembourg investment funds

(Dec. 2006-Dec. 2024; percentages)

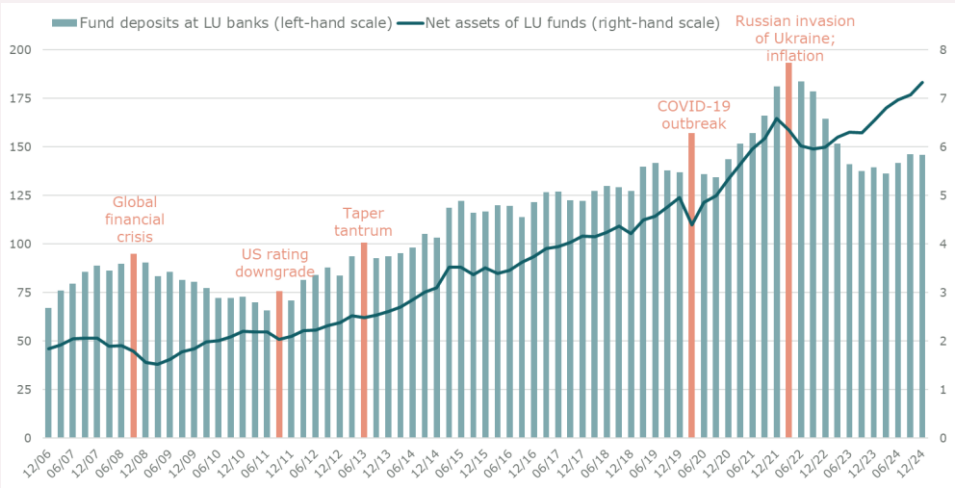


Sources: Banque centrale du Luxembourg, CSSF and Federal Reserve Bank of St. Louis.
Notes: Deposits held by foreign funds at Luxembourg banks and deposits held by Luxembourg funds at foreign banks are excluded. The VIX index measures market expectation of near term volatility conveyed by stock index option prices.

Chart A.2

Total deposits held at Luxembourg banks by investment funds

(Dec. 2006-Dec. 2024; left-hand scale: EUR billions, right-hand scale: EUR trillions)



Sources: Banque centrale du Luxembourg and CSSF.
Note: Deposits held by both Luxembourg and foreign investment funds are included.

The increase in funds' deposits at times of high market volatility provides banks in Luxembourg, and their international parent companies, with a hedge against liquidity risk. Custodian banks are the main recipients of deposits from funds (77%). They either channel the liquidity on a short-term basis to their parent companies or other banks, or they deposit it at the central bank. Unlike traditional banks, which have an

asset-driven balance sheet, custodian banks are liability-driven.[87] This means the size of their balance sheet is not driven by the amount of loans granted to households or non-financial corporations, an activity in which custodians typically do not engage, but by the amount of deposits received on the liabilities side, mainly from investment funds. As a result, custodians have a balance sheet that "breathes", with net deposit inflows from funds under adverse market conditions resulting in higher funding provided to their parent companies and to other banks.

Notwithstanding the favourable developments in the past with respect to funds' deposits at banks, the Luxembourg authorities have taken measures to ensure that custodian banks remain resilient in the event of a hypothetical outflow. They have introduced an extended framework for other systemically important institutions (O-SIIs) accounting for bank-fund linkages.[88] The standard O-SII framework has been augmented by two additional indicators: (i) a centrality measure for the bank-fund network of exposures, and (ii) the amount of funds' assets under custody at banks. Three custodian banks were identified as O-SIIs in the past, although none remain so as they have converted into branches of foreign banks. In addition, the CSSF runs a dedicated biannual stress test of funds' deposits at banks. This applies an extremely severe redemption shock of 20% of net assets over one week to each fund domiciled in Luxembourg and assumes that funds meet the redemptions by selling HQLA and withdrawing deposits pro rata (i.e. a vertical slicing assumption). This results in an average run-off rate for fund deposits of 57% across Luxembourg banks. All banks would be able to meet the outflows using their HQLA and short-term interbank deposits.

87 For more details, see Coste, Tcheng and Vansieleghem (2021).

88 For more details see Gehrend (2017).

Box 2
US dollar funding of Nordic banks from NBFI entities

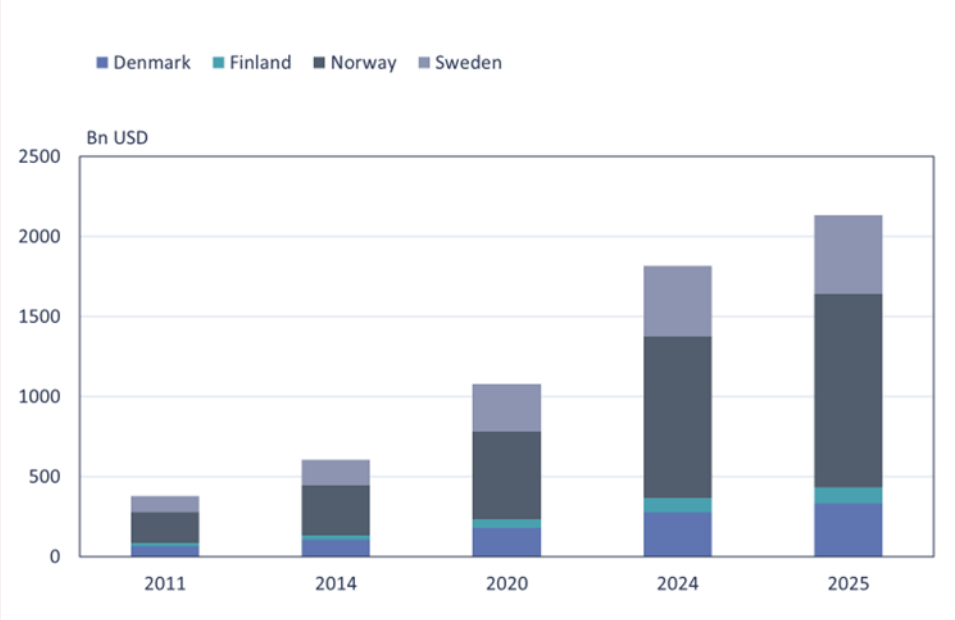
Prepared by Kimmo Koskinen, Juho Nyholm (Suomen Pankki) and Laura Savio (Finanssivalvonta)

The US dollar is the most important currency in the international monetary and financial system and plays this role for the Nordic countries, too. The deep and liquid dollar markets have long been attractive to companies, banks and investors around the world and have delivered superior risk-adjusted returns and portfolio diversification for decades. The Nordic countries are home to large institutional investors who invest heavily in dollar assets (Chart B.1), as they do not have sufficient opportunities in their local markets.[89] The dollar is also widely used in trade invoicing. It is the standard currency for industries that are important in Nordic economies, such as shipping, oil and raw materials. Both institutional investors and non-financial corporations need to source dollars, and often do so via local banks.

Chart B.1

Direct holdings of US securities by Nordic investors

(Jan. 2011-Oct. 2025, USD billions)



Source: U.S. Department of the Treasury.

The global US dollar market features complex interlinkages between various participants and markets. Widespread international use of the dollar generates significant benefits for the global financial system. According to the Bank for International Settlements, these benefits arise particularly from economies of scale, network effects and unified regulatory frameworks and financial market

[89] Private and public pension funds, insurance corporations, investment funds and sovereign wealth funds.

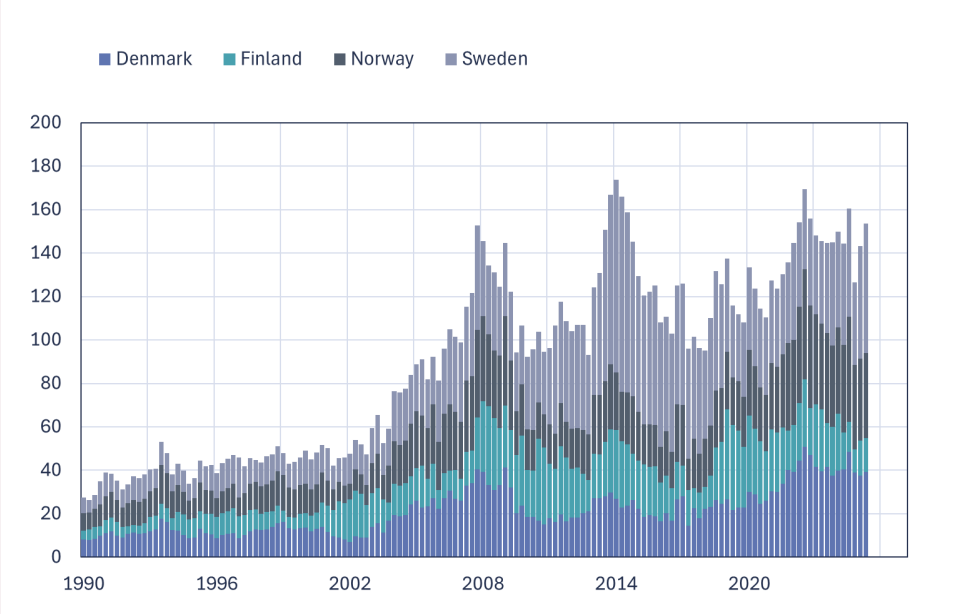
infrastructure, which reduce the costs of capital transfer and financial system risks.[90] On the other hand, it can also lead to increased vulnerabilities, as the heightened interconnectedness of the global financial system can transmit and amplify shocks originating from the United States or elsewhere in the dollar financial markets around the world.

Globally active banks, including Nordic institutions, are the main intermediaries in the dollar market. This creates interlinkages to NBFI entities on both sides of banks' balance sheets. Non-US banks generally do not have access to stable dollar funding (retail deposits). This is why, on the liabilities side, the bulk of the dollar funding is obtained via wholesale markets.[91] Typically, this includes wholesale deposits made by institutional investors or corporate treasuries, unsecured debt instruments issued by banks (CDs, CP, bonds) and secured debt such as repos or covered bonds. Investors in these dollar-denominated bonds and notes are typically money market funds, various investment funds and other institutional investors. On the assets side, money is lent to institutions or corporates as short-term loans and repos or via the FX derivatives market.[92] Banks also use FX derivatives themselves to balance the currency imbalances in their balance sheets arising from international financial activities. Overall, banks' dollar funding can be substantial (Chart B.2) and its share in total cross-border funding varies between 10-30%.

Chart B.2

US dollar-denominated cross-border liabilities of Nordic banks

(Jan. 1990-Jun. 2025, USD billions)



Source: BIS.

90 See Committee on the Global Financial System (2020).

91 See Klaus and Mingarelli (2024).

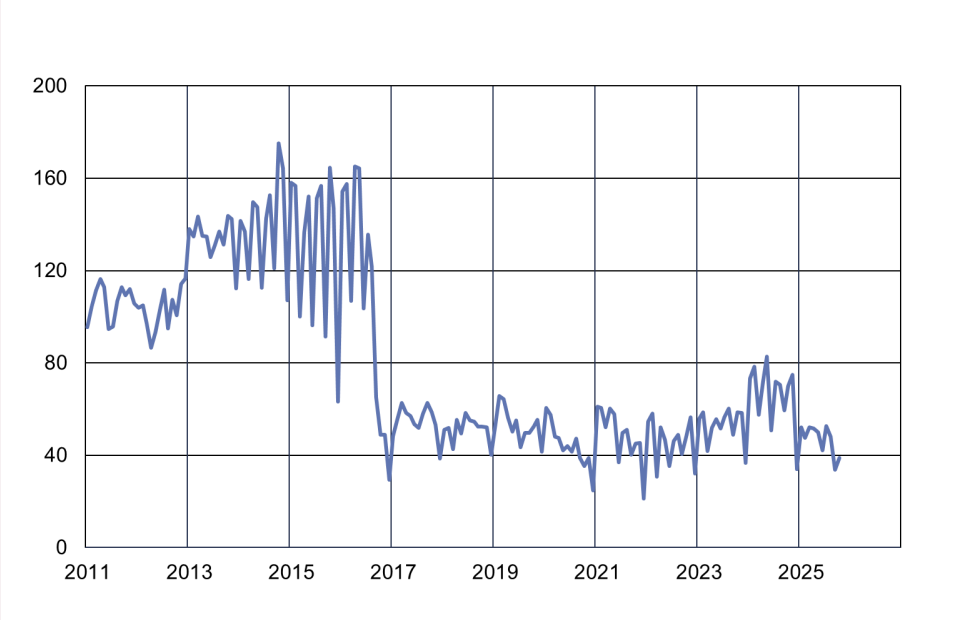
92 See Sveriges Riksbank (2025) 4.1 The major banks are well placed to deal with uncertainty in the financial markets.

The US affiliates of Nordic banks play an important role in their dollar funding and liquidity management. US prime money market funds are a major investor class in dollar-denominated commercial paper issued by Nordic banks in the United States. Even though various regulatory changes have reduced usage of this source,[93] Nordic banks' outstanding stock of dollar-denominated CP held by US MMFs has been around USD 40-80 billion over the past year (Chart B.3). Nordic banks' US branches deposit some of this funding as reserve balances with the Federal Reserve, but the rest is shifted to their parents back home.

Chart B.3

Exposure of US prime MMFs to Nordic banks

(Jan. 2011-Oct. 2025, USD billions)



Source: OFR.

Nordic banks also issue dollar-denominated debt securities and commercial paper in Europe. The investors in these liabilities are typically US dollar money market funds registered in Ireland and Luxembourg, but also investment funds, other euro area banks and European insurance corporations and pension funds (Chart B.4).

Nordic banks typically swap their dollar funding into Nordic currencies or euro. FX swaps and forwards, which are generally shorter-maturity instruments, are a significant source of dollar funding and hedging for investors and corporates, helping facilitate trade and investment in dollar assets. Investors enter into swaps whereby they "borrow" dollars in exchange for the domestic currency over a certain period. The FX derivatives market creates substantial interconnections between banks and NBFI entities.

There are several distinctive features in the Nordic area that pose challenges to cross-border analysis. The Nordic financial market is highly interconnected and has

[93] Nordic banks have probably shifted part of their dollar borrowing to other non-bank sectors in the United States that are not disclosed publicly, as has the US MMF sector.

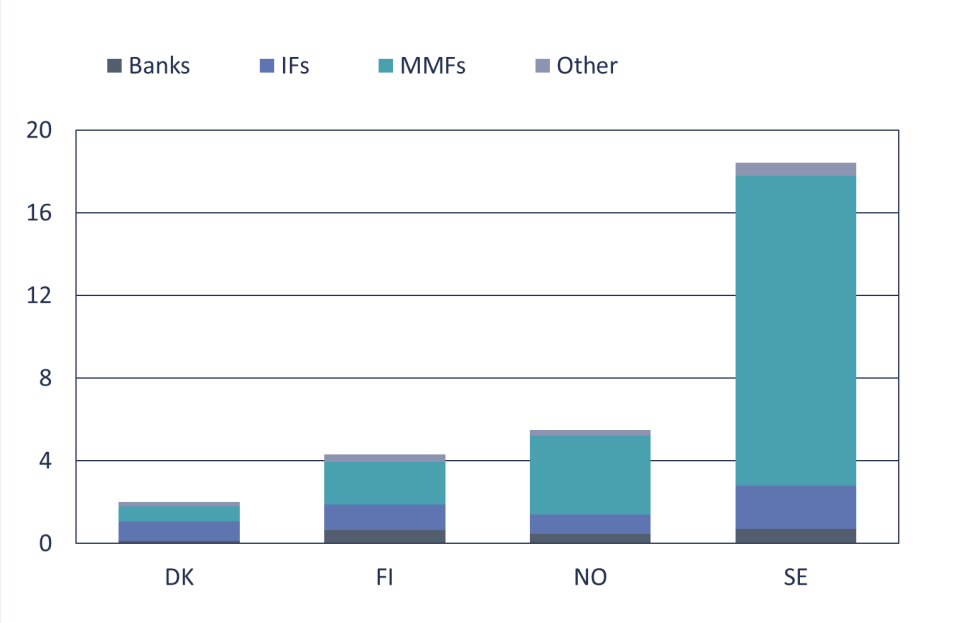
large banks operating in multiple countries. The area also consists of several currency areas; as Finland is the only country to use the euro, most of the data collections commonly used within the euro area are not common to any other countries in this region.

Despite the large nominal values of transactions in currency derivatives markets, the market values of the agreements are relatively small. Where banks' dollar liabilities exceed their dollar-denominated assets they use FX derivatives markets to hedge against the currency risk imposed by this mismatch. This is, in effect, short-term dollar lending to their customers.94

Chart B.4

Holdings of US dollar-denominated debt securities of Nordic banks, by euro area investor

(Sep 2025, EUR billions)



Source: ECB (SHS).
Note: IFs stands for investment funds; MMFs stands for money market funds.

While derivatives provide a hedge against currency risk, the short-term nature of dollar funding can impose a maturity mismatch which poses a liquidity risk in the event of financial market turbulence.95 NBFI investors are particularly vulnerable to roll-over risks in FX derivatives markets if banks' ability to provide dollar liquidity weakens. Investors could be forced to sell off some of their dollar assets to be able to repay the dollars they borrowed in the swap market.

Significant reliance on foreign currency funding, particularly short-term, from NBFI entities exposes banks to liquidity and funding risks, especially during times of

94 Generally, Nordic banks tend to have much larger liabilities in dollars than they do assets, which exposes them to currency risk. To mitigate this, they use derivatives markets to lend dollars.

95 See Eren, Schrimpf and Sushko (2020).

market stress.[96] However, there are several mitigating factors that can help reduce these and improve the resilience of funding structures, such as holding sufficient liquid assets, diversifying funding sources and hedging FX mismatches appropriately. Furthermore, strong capital adequacy improves the availability and terms of market funding and provides security against financial market disruptions.

Despite a relatively high dependence on dollar-denominated short-term unsecured market funding, the Finnish banking sector (as a proxy for all the Nordic countries) demonstrates strong resilience against disruptions in the dollar market as it holds large quantities of liquid assets denominated in the currency. Finnish banks maintain a robust dollar-denominated liquidity position with ample HQLAs to meet potential short-term liquidity needs. These would also be sufficient to cover the dollar-denominated net outflows under a hypothetical 30-day stress scenario. The dollar-denominated liquidity coverage ratio (LCR) for Finnish banks has on average been higher than the general liquidity coverage ratio for all currencies, and well above 100%.

However, the LCR describes only short-term liquidity, which is why it is essential to assess a bank's funding sources in relation to its liquidity profile over the long term, too. The dollar-denominated survival horizon for Finnish banks exceeds one year, significantly longer than the general survival horizon of the Finnish banking sector, and has extended further in recent years. Additionally, Finnish banks benefit from access to the ECB's operations providing dollar liquidity.

The dollar liquidity position of the Finnish banking sector is strong even based on the currency-specific stress test. Both it and other Nordic countries have substantial receivables from currency swap agreements which would support dollar-denominated liquidity in a stress scenario. However, since these receivables originate from the maturity of hedging and funding instruments sold to non-financial corporations and NBFI investors, if banks were to utilise these receivables to offset dollar funding outflows it would suggest that investors and non-financial corporations are unable to hedge and secure dollar funding independently.

[96] See Klaus and Mingarelli (2024).

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For specific terminology please refer to the ESRB glossary (available in English only).

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