ESRB
European Systemic Risk Board
European System of Financial Supervision

NBFI Monitor

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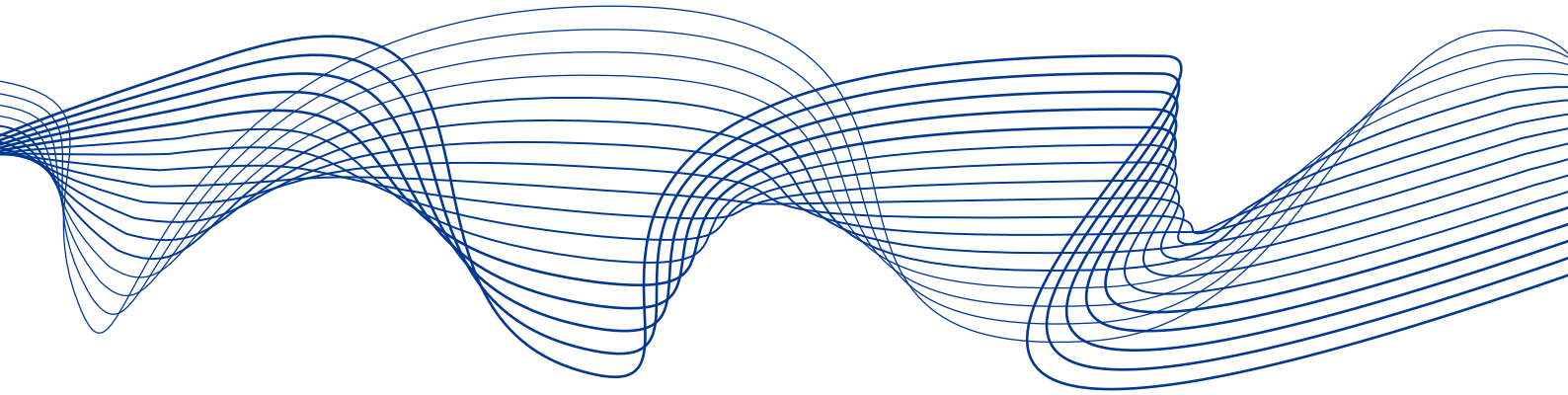
EU Non-bank Financial Intermediation Risk Monitor 2025



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Executive summary

This report considers the main risks and vulnerabilities associated with investment funds and other financial institutions (OFIs), as well as crypto-assets and associated intermediaries, in 2024. It presents an activities-based view of financial market segments commonly associated with non-bank activities. It covers developments, risks and vulnerabilities associated with financial intermediation outside the banking system, focusing on those related to liquidity and maturity transformation, use of leverage and interconnectedness. The report covers entities engaged in asset management activities, in particular investment funds and OFIs. Insurance corporations, pension funds and central counterparties are not covered in the report due to the differing risk profiles of their main activities. In addition to traditional finance outside the banking system, the NBFI Monitor also reports on key developments and risks in crypto-asset markets. As well as examining the key developments in 2024, the 2025 NBFI Monitor includes an overview of market developments following the announcement of tariffs by the US Administration in the spring of 2025.

In 2024 total assets of investment funds and OFIs increased to a record €50.7 trillion. Investment funds and OFIs are over 20% larger than the banking sector in terms of assets. This growth primarily reflects valuation effects, with equity assets under management increasing considerably because of rising valuations of US technology stocks. Credit provided by non-banks[1] also grew in 2024. After a slight fall in 2023, the rebound of market-based credit saw non-bank sources comprising nearly 23% of total credit to non-financial corporations (NFCs), underscoring their growing importance in providing financing alternative or complementary to bank funding. Some developments within subsets of the sector deserve specific attention. Hedge funds, including those in the EU, increased their leverage. This was particularly the case for hedge funds investing in sovereign bond markets, including funds using basis trades. Additionally, real estate funds encountered challenges from rising interest rates, resulting in negative returns and substantial redemption requests in certain areas. Money market funds saw asset growth, particularly within the stable net asset value offerings. Finally, the interconnectedness between crypto-assets and traditional finance intensified, which coincided with a sharp rise in crypto-asset valuations and the expansion of stablecoins, emphasising the necessity for comprehensive risk monitoring.

Non-banks faced heightened cyclical risks driven by macroeconomic vulnerabilities, asset price volatility and reduced market liquidity. The materialisation of macroeconomic risks threatens the balance sheets of NFCs and households, potentially increasing bankruptcies and insolvencies. Tighter financial conditions, geopolitical tensions and muted growth prospects raise the risk of disorderly asset price declines, challenging investment funds and OFIs. Sovereign vulnerabilities in the euro area, exacerbated by political uncertainty and fiscal

[1] For the sake of brevity, this report uses the term “non-banks” as shorthand for “non-bank financial intermediaries”.

weaknesses, increase the likelihood of sharp and unexpected moves in asset prices. Furthermore, the concentration of EU investment fund assets in US technology stocks could amplify potentially sharp market corrections in this market segment. Systemic liquidity risks remain high, with recent episodes of market stress highlighting vulnerabilities in highly leveraged funds. These funds may see large margin calls in a market stress episode and need to deleverage through forced sales, affecting the markets they invest in. The EU real estate market also remains vulnerable, particularly in commercial real estate (CRE), which faces challenges from transitioning to environmentally efficient buildings. These cyclical risks are amplified by structural vulnerabilities within non-banks.

Non-banks exhibit several key vulnerabilities, primarily revolving around excessive leverage, liquidity mismatch and interconnectedness. High leverage, particularly in alternative investment funds (AIFs) and some undertakings for collective investment in transferable securities (UCITS), can amplify liquidity and market risk and transmit and magnify shocks to the financial system. Mismatches between the liquidity of the assets open-ended investment funds invest in and the redemption terms they offer to investors expose these funds to liquidity risks. Forced sales of illiquid assets to meet investor redemptions could exacerbate market stress during periods of strain in the financial system. The growing interconnectedness within the NBFI sector, including through investment funds' substantial holdings in each other's assets, and with other parts of the financial system (e.g. the banking sector) heightens the risk of shock transmission across the financial system. These vulnerabilities are further compounded by data gaps, poor data quality and obstacles to data sharing, which hinder effective monitoring and risk assessment. Addressing these vulnerabilities requires enhanced regulatory oversight and improved data frameworks to ensure financial stability.

The monitoring approach identifies risks related to leverage and interconnectedness in non-banks, which are analysed in detail in several special features. A first set of special features focuses on leverage in the fund sector, analysing risks for AIFs and UCITS and carry trade strategies pursued by global hedge funds. Vulnerabilities related to interconnectedness are explored in a second set of special features in the context of EU banks' credit exposures to EU real estate funds and direct interlinkages between captive financial institutions (CFIs), real estate funds and private equity funds.

The first special feature assesses risks related to excessive leverage in EU-domiciled AIFs, focusing mostly on hedge funds and liability-driven investment (LDI) funds. Using entity and activity-level data, the analysis reveals that hedge funds and LDI funds, which rely heavily on financial and synthetic leverage, are highly exposed to market shocks, notably interest rate increases. Stress scenarios indicate substantial potential losses, underscoring the need for continuing regulatory oversight under Article 25 of the Alternative Investment Fund Managers Directive. The analysis points to the need to enhance stress testing and integrate transaction-level data to better manage systemic risks and ensure financial stability.

The second special feature identifies vulnerabilities in UCITS using the absolute value at risk approach, which allows for high leverage levels that sometimes exceed those of AIF hedge funds. These funds represent 8% of the UCITS sector, and a subset of highly leveraged funds on a gross basis (2% of the UCITS sector) is exposed to significant market and liquidity risks due to directional positions and low holdings of liquid assets. Despite their small sectoral footprint, these highly leveraged funds may pose potential risks to financial stability and the reputation of the UCITS brand. Reflecting this, in its response to the European Commission's consultation on NBFI, the European Systemic Risk Board called for harmonised leverage regulations and more granular data to effectively address these risks.

The third special feature explores how hedge fund leverage, particularly in carry trades, can pose risks to financial stability through position liquidation and counterparty channels. The August 2024 market turmoil, driven by monetary policy shifts and thin liquidity in financial markets, underscored these risks, as deleveraging by hedge funds likely amplified market volatility. The complexity and cross-border nature of hedge fund strategies make effective oversight challenging. The analysis indicates how a combination of position-based monitoring and return-based style analysis allows for a better assessment of carry trade risks and potential market spillovers.

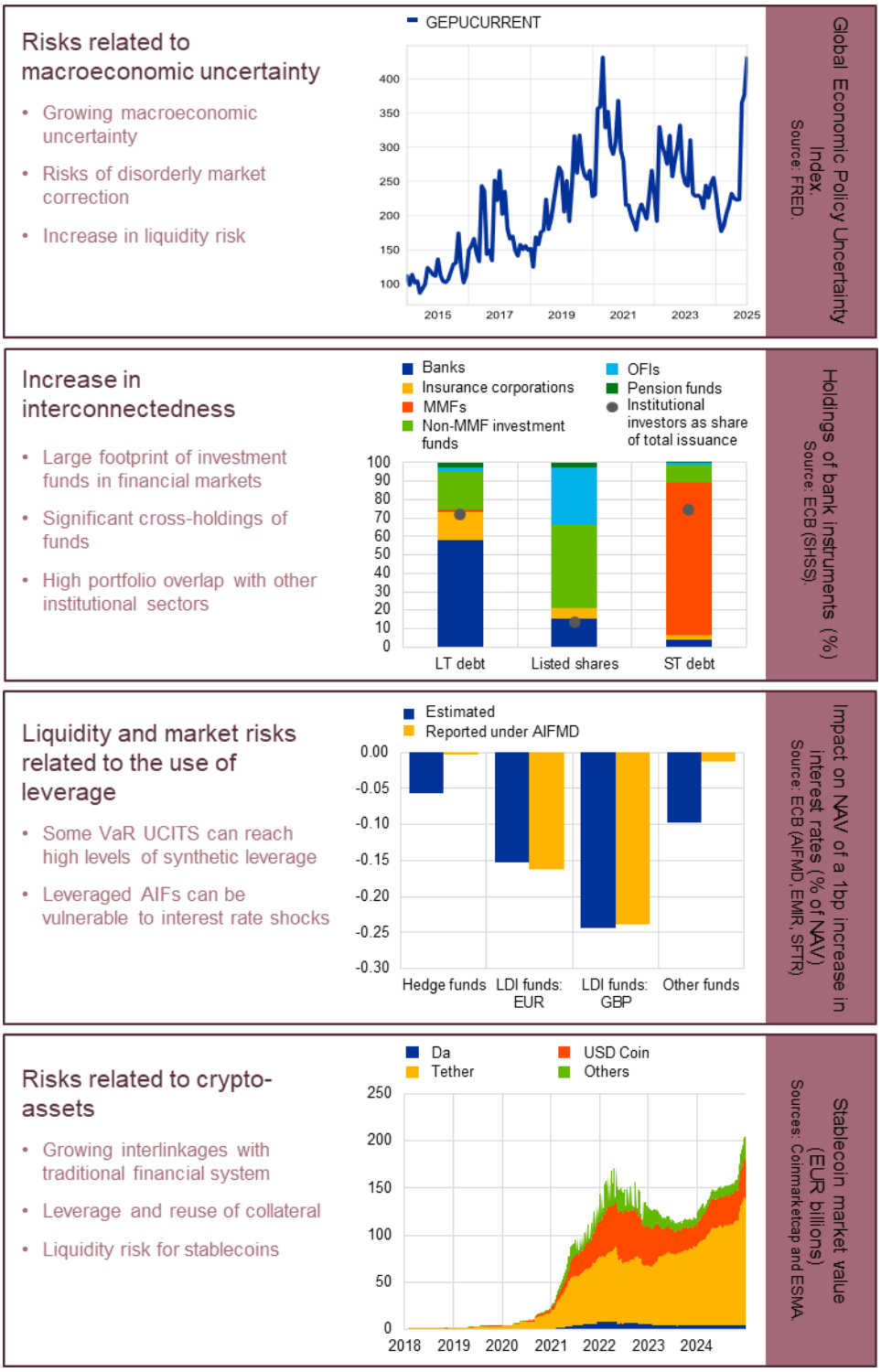
The fourth special feature looks at the provision of credit by EU banks to real estate investment funds (REIFs). Structured mainly as open-ended AIFs, REIFs tend to have liquidity mismatches and be highly leveraged. Although REIFs account for a smaller portion of banks' CRE exposure in the EU compared with the United States, some funds are highly reliant on bank credit, including credit lines. REIFs rely on loans and credit lines secured by commercial properties, which may expose banks to wrong-way risk during market stress. Concentration risks and ownership ties further increase the potential for negative spillovers to the banking sector.

The fifth special feature focuses on the links between CFIs and certain segments of the EU fund sector. CFIs facilitate liquidity management and financing within transnational corporations, yet unharmonised and mostly high-level EU data collection complicates risk assessment. In Luxembourg, CFIs are pivotal for private equity and real estate funds' investments, which are often structured to prioritise senior creditors. While most CFIs have low credit exposure, some are heavily reliant on loans, especially in private equity. Banks, mainly German for real estate and US for private equity, are the primary lenders.

This edition of the NBFI Monitor contains three topical boxes. Box 1 highlights the market turbulence following US tariff announcements in April 2025, exposing vulnerabilities in US Treasury and swap markets and affecting non-banks. Box 2 focuses on the Dutch pension system's transition to a defined contribution model, affecting interest rate hedging strategies and potentially market liquidity. Box 3 discusses the EU's growth in synthetic securitisation under the simple, transparent and standardised label. The developments described in these boxes point to the variety of developments that are relevant to the monitoring universe of the NBFI Monitor.

Figure 1

Summary of main risks and vulnerabilities in the NBFI sector



Source: ESRB.

1 Key developments

This year's edition of the NBFI Monitor includes an overview of developments prompted by the announcements of large tariffs by the US Administration. The NBFI Monitor typically examines key developments in the previous calendar year, with this year's monitor focusing on developments in 2024. However, the announcement of large tariffs by the US Administration triggered an episode of heightened volatility in financial markets in spring 2025. This episode was short-lived, with valuations rebounding quickly due to delays in the tariffs' implementation. Although non-banks and markets proved resilient, the episode nonetheless induced some stress within the NBFI sector and is therefore covered in this edition of the NBFI Monitor (Box 1).

Box 1
April market volatility around US tariff announcements

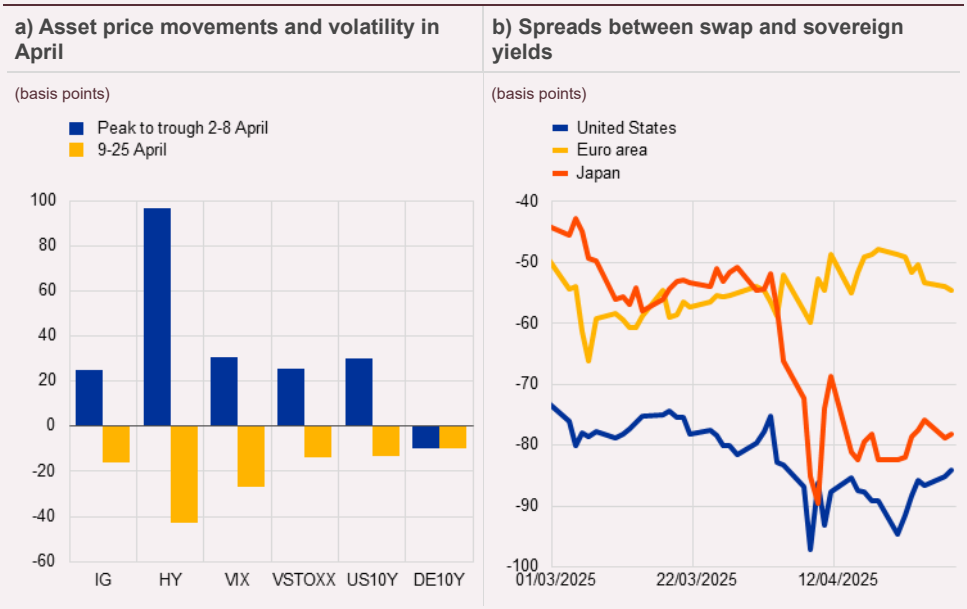
The announcement of large and broad-based tariffs by the United States on 2 April 2025 triggered an episode of market turbulence across asset classes. Initially, equity markets dropped amid high volatility, yields on sovereign bonds declined and corporate credit spreads increased as investors reduced exposures to riskier assets (Chart A, panel a). For example, EU high-yield bond funds experienced outflows of 2.3% of net asset value between 2 and 9 April, and EU high-yield exchange-traded funds saw outflows of 6.4% according to J.P. Morgan estimates.[2] By comparison, outflows from euro area funds in March 2020 reached 5% for investment-grade bond funds and more than 10% for high-yield bond funds (including outflows of 5% in a single week).[3] Meanwhile, sovereign bond funds and money market funds saw large inflows, reflecting investors' portfolio reallocation. Bitcoin lost 6% on the day of the announcement but subsequently rebounded when a pause in the tariffs was made public. Non-banks in the EU proved resilient in this episode, with no major incidents reported.

[2] J.P. Morgan (2025), "European Credit Fund Flows", *Weekly Update*, Europe Credit Research, 11 April.

[3] See European Central Bank (2020), "Financial Stability Review", May, and Financial Stability Board (2020), "Holistic Review of the March Market Turmoil", November.

Chart A

Asset price and swap movements



Source: ESMA.
Notes: In panel a), IG refers to spreads on the ICE Bank of America Global Corporate Index, HY refers to spreads on the ICE Bank of America Global High Yield Index, and US10Y and DE10Y are yields on US 10-year Treasuries and German ten-year bunds. In panel b), the data show the difference between the 30-year overnight index swap rate and the corresponding 30-year sovereign yield.

This episode also triggered margin calls on equity and foreign exchange derivatives, especially for entities with long USD exposures. In contrast to previous stress events, the US dollar depreciated and US yields rose. After US authorities announced a 90-day suspension of additional tariffs beyond the base 10% tariff applicable to all countries on 9 April, asset valuations returned to pre-2 April levels. During this episode, markets by and large functioned normally without notable disruptions.

However, this episode may have longer-lasting consequences. First, in financial markets, the severity of the short-lived event might lead to higher initial margins, as margin models typically consider high-volatility events when calibrating margins.[4] Second, the macroeconomic landscape shifted markedly following the tariff announcements, with the International Monetary Fund revising its global growth forecast downward by 0.5 percentage points to 2.8% for 2025, citing the "major negative shock" of tariffs and policy unpredictability.

The event also exposed fragilities in US Treasury and swap markets, characterised by large intraday movements (Chart A, panel b). These fluctuations can be attributed to deleveraging by investors and the prevalence of investment strategies that seek to arbitrage across related asset classes (such as US Treasuries and US futures for basis trades, and US Treasuries and USD swaps for swap trades). In times of stress, these arbitrage opportunities might break down, triggering procyclical effects.

[4] For example, some CCPs such as LCH take the average of the six worst daily historical moves to calculate initial margins on swaps.

The abrupt imposition of tariffs disrupted supply chains and amplified fears of stagflation, particularly in trade-dependent economies. Investor sentiment deteriorated rapidly, as evidenced by a 40% surge in the VIX volatility index and record derivative market trading volumes, reflecting heightened uncertainty over growth prospects and corporate earnings.[5]

For non-banks, these developments exacerbated vulnerabilities, including liquidity mismatches. The rapid repricing of risk assets, coupled with widening corporate bond spreads to levels unseen since 2020, strained balance sheets and raised concerns about fire sales in leveraged positions. Open-ended funds faced only mild redemption pressures, but the sector could be susceptible to sudden shifts in investor behaviour. Non-bank investors might look to further rebalance their portfolios in response to evolving financial and economic developments. Volatility and spikes in margin calls could also result in further fire sales of assets by leveraged investors, including leveraged investment funds. Relative value and carry trades could be unwound, putting additional pressure on relevant markets. Going forward, mitigating systemic risks from non-banks' collective actions may need to take into account a fragmented trade environment that threatens cross-border capital flows and risk diversification.

1.1 Market developments

Despite a positive macroeconomic backdrop, geopolitical and economic uncertainties rose in 2024. After a period of prolonged and widespread stagnation, the EU economy grew in 2024, amid a slowdown in inflation, with real GDP rising by 1% in 2024 and projected to increase by 1.1% in 2025 and 1.5% in 2026.[6] However, with productivity growth expected to remain subdued, economic activity and credit may be constrained for an extended period, potentially increasing credit risk amid high levels of private and public sector indebtedness. Despite benign macroeconomic developments, economic and policy uncertainty increased in 2024. There were episodes of volatility, exemplified by the fluctuations in French sovereign bond markets amid market concerns that it would be difficult to form a stable government in the summer of 2024.

The role of investment funds and other financial institutions (OFIs) as a source of funding to EU non-financial corporations (NFCs) has expanded further. From a flow perspective, net financing raised by euro area NFCs increased in 2024 compared with 2023, with a rise in the share of non-bank credit. Financing obtained through the issuance of debt securities was greater in 2024 (€32 billion) than in 2023 (€22 billion, Chart A1). By contrast, funding raised by NFCs through bank loans slowed (€53 billion compared with €74 billion in 2023[7]) and fell below financing

5 See MSCI (2025), "Volatility Tremors Spread After Tariff Shock", 9 April.

6 See European Commission (2025), "European Economic Forecast", spring, and International Monetary Fund (2025), "World Economic Outlook", April.

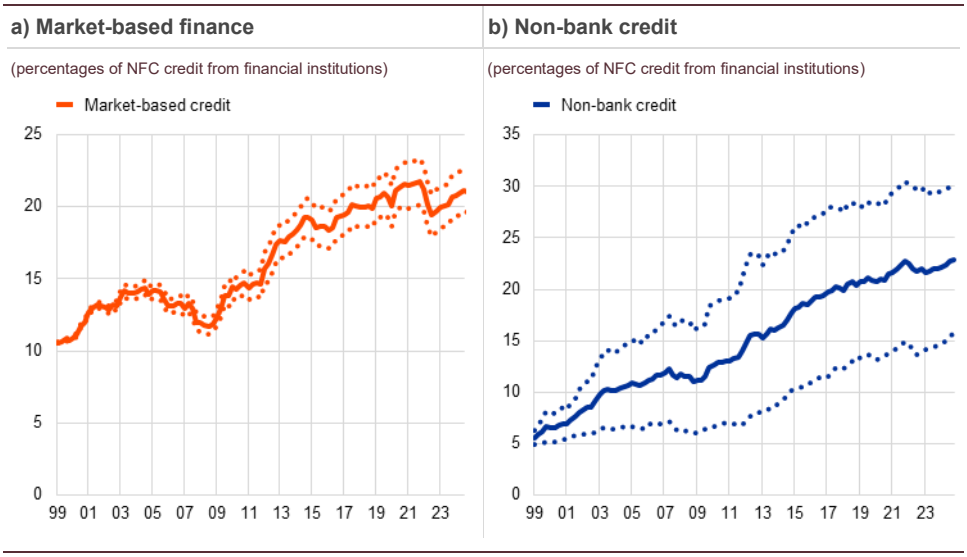
7 Bank loan issuance towards NFCs is naturally volatile and changes significantly each year.

through debt securities in absolute terms. Market-based credit, i.e. intermediated via markets in the form of debt securities and non-retained securitised loans, rebounded to over 21% of total external credit to NFCs (Chart 1, panel a). Credit provided by funds and OFIs to NFCs also increased to nearly 23% (Chart 1, panel b). Both market-based and non-bank credit have approximately doubled since the global financial crisis. Non-banks can play a crucial role in the savings and investments union by providing alternative financing options and enhancing capital market access for both investors and businesses, thereby supporting the EU's strategic objectives of economic growth and competitiveness.[8]

The size of the monitoring universe reached a new high at the end of 2024, primarily reflecting positive valuation effects. Total assets of EU investment funds and OFIs increased to €50.7 trillion at the end of 2024, compared with €47.4 trillion at the end of 2023, reaching their highest level in recent history (Chart A2). The increase in both was mainly driven by revaluation gains (Chart A5). Overall, assets of investment funds and OFIs accounted for 42% of EU financial sector assets at the end of 2024, compared with 41% in 2023 (Chart A3).

Chart 1

After a slight decline, market-based finance and non-bank credit to NFCs returned to growth thanks to flow and valuation effects



Sources: ECB and ESRB calculations.
Notes: Market-based credit reflects the share of market-based debt finance (debt securities and non-retained securitised loans) relative to the total external debt of euro area NFCs, irrespective of which sector provided the credit. Non-bank credit reflects the relative share of investment funds and OFIs in providing debt financing to euro area NFCs compared with credit provided by all financial institutions (the non-bank financial sector and banks), irrespective of whether that financing is provided in the form of loans or debt securities. The solid line reflects an average of the dotted lines, which include (dotted line at the top) or exclude (dotted line at the bottom) loans granted by a residual of OFIs. Due to data limitations, it is unclear whether a financing vehicle of an NFC should be classified as pertaining to the NBFI sector or not. The methodology is similar to that described in Box 2 of European Central Bank (2022), "Financial Integration and Structure in the Euro Area", April, but insurance corporations and pension funds are excluded. The latest observations are for 2024.

The growth of investment funds' assets under management (AuM) in 2024 mostly reflects that of equity funds' AuM, largely driven by US equity valuations. Net assets rose by 14% to €20.2 trillion at the end of 2024, reflecting mostly valuation effects for equity funds (a rise of €890 billion compared with €1.92

[8] See the European Commission's savings and investments union strategy.

trillion for all funds). The growth in equity funds has been coupled with an increase in concentration of exposures – particularly exposures to US technology stocks. Holdings of Magnificent 7[9] stocks have risen to account for 13% of total equity holdings of EU funds. Mixed and other funds also saw large valuation gains in 2024, at €300 and €270 billion respectively. By contrast, growth in other segments of the EU fund sector was either more subdued (+2% for real estate funds) or mostly driven by inflows. Bond funds grew by 13%, with investor inflows accounting for most of the increase (€330 billion compared with revaluation gains of €120 billion).

Hedge funds globally have increased their leverage. There appears to have been a global shift in hedge fund business models in 2024. Hedge funds in the United States increased their leverage (Chart 2, panel a). Similarly, hedge funds in the EU increased their financial leverage by 5 percentage points to 15% of net asset value (NAV). Additionally, their gross leverage rose by approximately 172 percentage points to 562% of NAV and their commitment leverage increased by about 177 percentage points to 441% of NAV. This change occurred between September 2023 and September 2024, particularly among funds employing macro and relative value strategies.[10] Hedge funds have also increased their presence in sovereign bond markets, both in US Treasury markets through basis trade strategies and also in European sovereign bond markets, including by increasing their repo borrowing.[11]

In the EU sovereign bond repo market, entities domiciled in the Cayman Islands transitioned from being net lenders to net borrowers in the third quarter of 2024. Securities Financing Transactions Regulation (SFTR) data indicate a shift in the net positioning of market participants based in the Cayman Islands, some of which pursue hedge fund strategies. In 2023 these entities were net repo lenders, receiving as collateral EU sovereign bonds amounting to approximately €100 billion (Chart 2, panel b). However, their net positions shifted in 2024 as these entities acquired leverage in the repo market. In the third quarter of 2024 Cayman-based entities became net repo borrowers, with balances rising to an average of €115 billion in the fourth quarter of 2024. During this period, their gross outstanding position remained broadly constant. The significant activity observed aligns with recent evidence on the growing role of hedge funds in sovereign bonds markets.[12] Changes in expectations about the future path of monetary policy and adjustments in basis trading strategies could be potential drivers behind the shift in net positioning. An increase in leverage-based strategies by offshore hedge funds in EU sovereign

9 The term “Magnificent 7” refers to a group of seven leading technology companies that have significantly affected the stock market due to their substantial market capitalisations and influential roles in the digital economy. This group comprises Alphabet (Google), Amazon, Apple, Meta (Facebook), Microsoft, Nvidia and Tesla.

10 See Office of Financial Research (2025), “Leverage by strategy”, Hedge Fund Monitor.

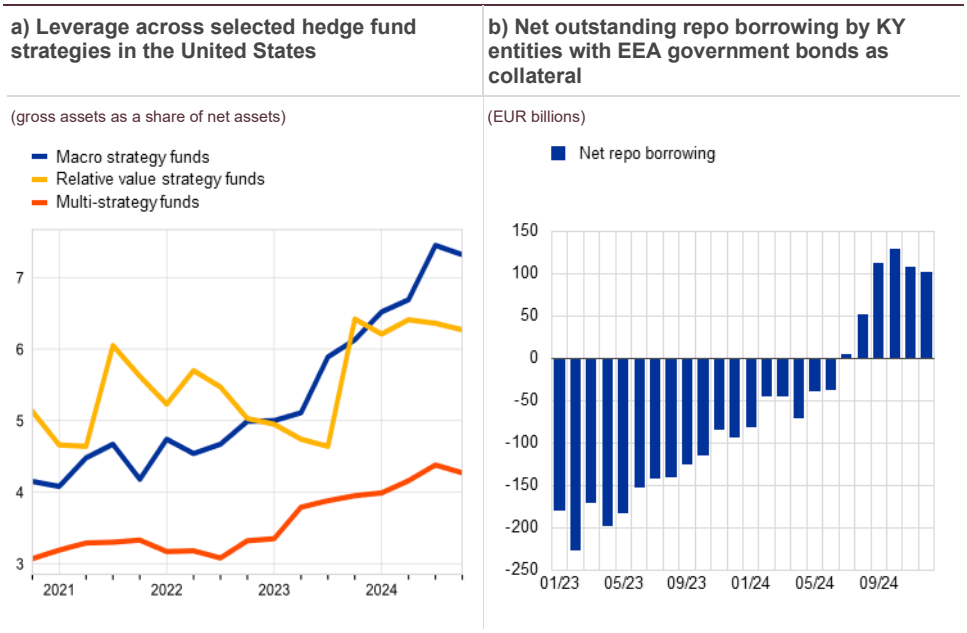
11 US hedge funds’ gross notional exposures to non-US sovereign debt increased by 50% between September 2023 and September 2024 to reach USD 2.6 trillion according to the OFR. The ECB Blog also reports increasing trading activity by offshore hedge funds in euro area sovereign bond markets.

12 See Maria Ferrara, F., Linzert, T., Nguyen, B., Rahmouni-Rousseau, I., Skrzypińska, M. and Vaz Cruz, L. (2024), “Hedge funds: good or bad for market functioning?”, *The ECB Blog*, 23 September.

bond markets could present risks to financial stability if, during stress periods, hedge funds quickly unwind their positions in those core markets.[13]

Chart 2

Hedge fund leverage and repo borrowing by Cayman Islands (KY)-based entities



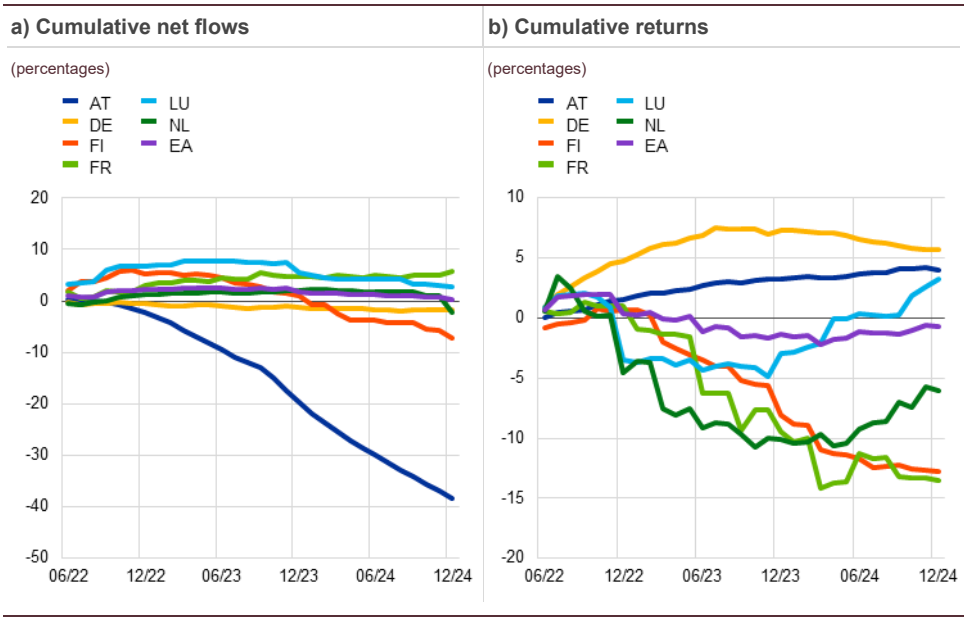
Sources: ESRB (SFTR), ESMA, ECB and US Office of Financial Research.
Note: The latest observations are for 20 December 2024.

Real estate investment funds (REIFs) faced negative returns and investor outflows in 2024. The increase in interest rates has reduced real estate valuations and raised refinancing costs. In some jurisdictions, including Austria and Finland, large redemption requests have been observed in recent years, up to 40% and almost 7% of NAV respectively (Chart 3, panel a). Some REIFs have used liquidity management tools, including the suspension of redemptions, to deal with these requests. Valuations of REIFs vary across jurisdictions, although funds in Finland, France and Germany reported negative performance in 2024 (Chart 3, panel b). Overall, REIFs in the euro area grew by 2.3%. While the assets of REIFs domiciled in Luxembourg increased by almost 10%, assets of funds in Germany and France declined by 1.2% and 2.9% respectively. German REIFs remain the largest, at €445 billion at the end of 2024, compared with €1.3 trillion for the euro area. The fourth special feature provides details on the interconnectedness between REIFs and banks.

[13] See Kruttli, M., Monin, P., Petrasek, L. and Watugala, S. (2021), "Hedge Fund Treasury Trading and Funding Fragility: Evidence from the COVID-19 Crisis", *Finance and Economics Discussion Series*, No 038, Board of Governors of the Federal Reserve System, April.

Chart 3

Cumulative redemptions and returns for real estate investment funds



Source: ECB (investment fund statistics).
Notes: Cumulative net flows represent a sum of net investor flows from June 2022 as a share of average NAV in the period in question. Cumulative returns represent monthly changes in NAV net of investor flow as a share of NAV, compounded to the period in question (from June 2022 to a given point on the chart).

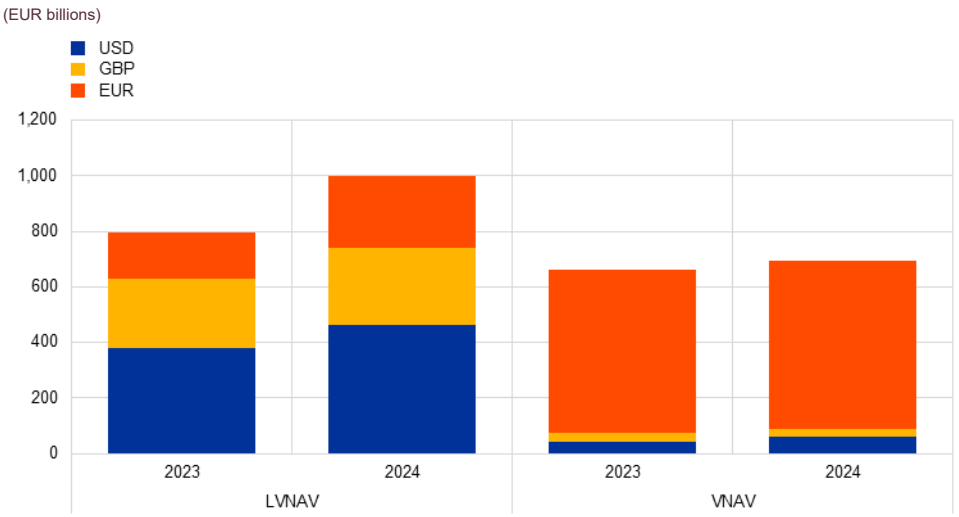
Assets of money market funds (MMFs) grew in 2024, mostly driven by funds offering a stable NAV. MMF assets increased by 4% during the year, reaching nearly €2 trillion by the end of 2024 (Chart A10). Growth was particularly strong across the three main currencies (EUR, USD, GBP) for low-volatility net asset value (LVNAV) MMFs. As a result, their share of AuM rose to 52% of the sector compared with 48% a year earlier (Chart 4). Among EUR-denominated MMFs, the share of LVNAV MMFs increased from 22% to 30%, with €90 billion in inflows. Conversely, MMFs across all currencies with a floating NAV grew less significantly. As a result, their share of AuM fell to 36% from 40% at the end of 2023. The share of government MMFs, which in the EU comprise almost exclusively USD and GBP-denominated funds, remained stable at 12%. The average maturity of assets held by MMFs rose from 2023 until June 2024, with a weighted maturity of almost 45 days at the end of June 2024, and then fell to 41 days by the end of the year (Chart A19). Non-EU investors continue to own most USD and GBP-denominated MMFs: they own more than 70% of USD MMFs (including 51% for UK and US investors alone), while UK investors own 90% of EU GBP MMFs. The global role of EU-domiciled MMFs denominated in USD and GBP highlights the necessity for a comprehensive assessment of the EU regulatory framework for MMFs and its alignment with international standards.[14] A special feature in the previous edition of the NBFI Monitor contains details of the international dimension of the EU MMF industry.[15]

[14] For more details, see European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

[15] See the special feature entitled "The international dimension of the EU money market fund industry" in European Systemic Risk Board (2024), "EU Non-bank Financial Intermediation Risk Monitor 2024", June.

Chart 4

Growth of MMFs driven by LVNAV MMFs in particular

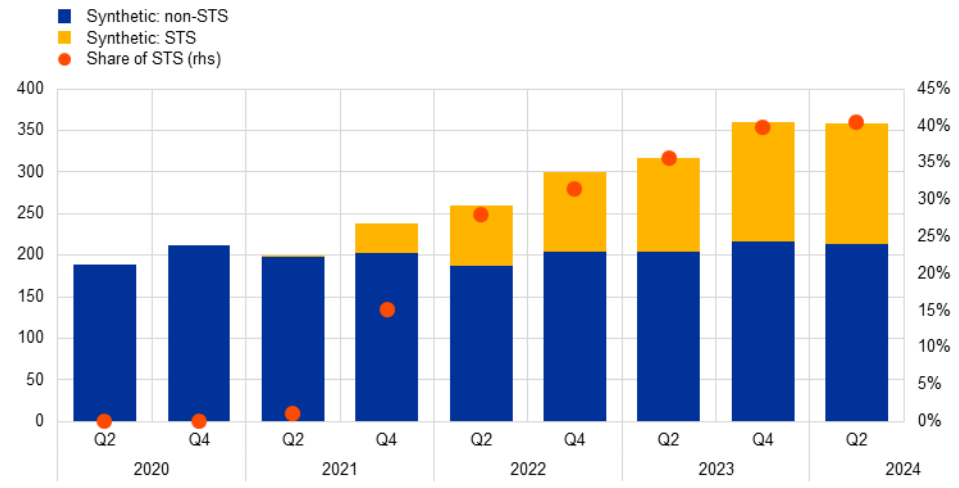


Source: ESMA (MMFR).

The size of the OFI sector increased slightly in 2024 (Chart A7, panel a). OFIs' assets in the EU amounted to €28.7 trillion at the end of 2024, with captive financial institutions (CFIs) accounting for 73% of the total. CFIs domiciled in Luxembourg and the Netherlands are by far the largest cohorts of OFIs, at €10 trillion and €5.5 trillion respectively. Assets of euro area financial vehicle corporations (FVCs), which are primarily used for securitisation, grew at a pace of just over 5%, while their risk indicators decreased slightly (Chart A25, panel a, and Chart A26, panel b). Securitised loans continued to be the main component of FVC portfolios, driven partly by the growth of simple, transparent and standardised (STS) securitisation and the use of significant risk transfer securitisation by banks to obtain capital relief (Chart 5 and Box 3).

Chart 5

Growth of synthetic securitisations driven by STS synthetic securitisations

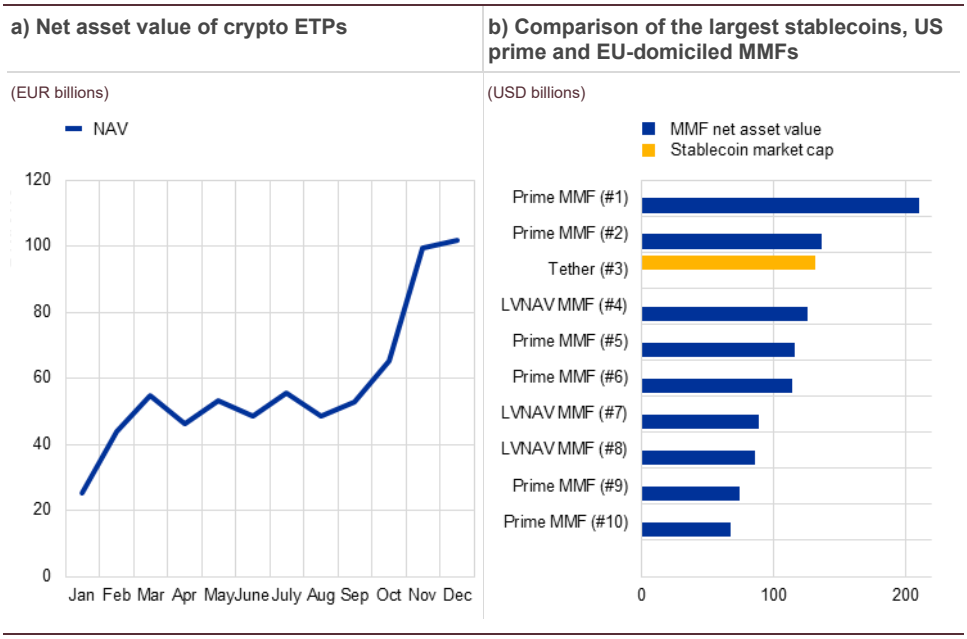


Sources: ESMA and ECB (COREP).

The crypto-asset markets doubled in size in 2024, and interconnections with traditional financial markets expanded further. The approval of spot bitcoin exchange-traded products (ETPs) in the United States early in the year and expectations of a favourable crypto regime under the new US Administration boosted investment. The market capitalisation of crypto-assets increased to €3.3 trillion, representing a 114% increase in a year. The spot bitcoin ETPs attracted cumulative net inflows of €34 billion over the year to reach a combined NAV of over €100 billion by December 2024 (Chart 6, panel a). Relatedly, the outstanding value of stablecoins increased by 73% to €240 billion. Tether (USDT), the largest stablecoin by far, accounts for 65% of the market and is comparable in size to the largest US MMFs (Chart 6, panel b).

Chart 6

Size of US crypto ETPs, and comparison of Tether with US prime and EU-domiciled MMFs



Sources: LSEG, ESMA and ECB.
Notes: Panel a): NAV of BTC-based ETPs in 2024. Panel b): The numbers in parentheses denote the ranking in terms of size. Values as at year-end 2024.

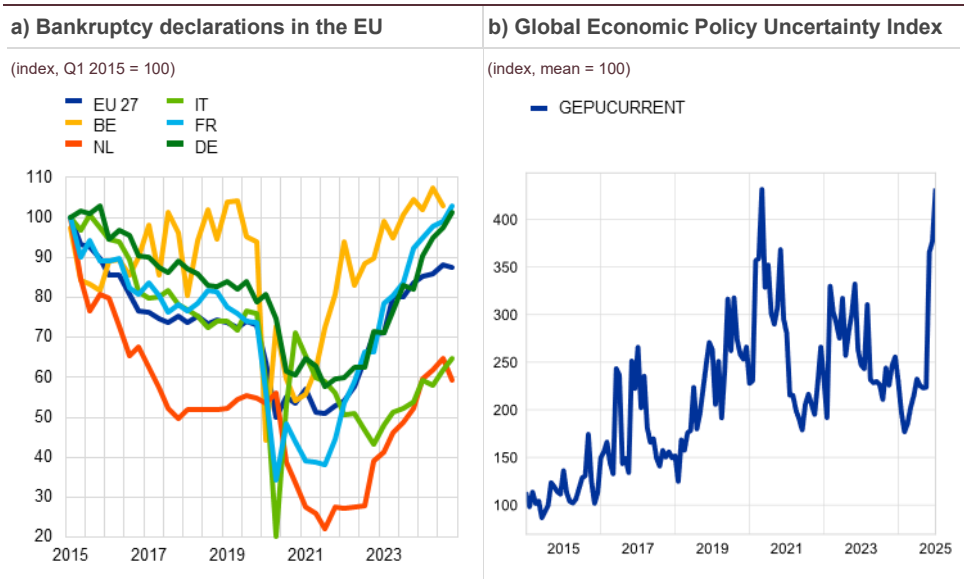
1.2 Key risks

Non-banks faced several pronounced cyclical risks in 2024. The materialisation of macroeconomic risks remains a primary concern, as it could lead to balance sheet stress for both NFCs and households. This stress may manifest as a sharp increase in bankruptcies among firms and insolvencies among households. Indeed, some countries in the EU saw rising declarations of bankruptcy in 2024 (Chart 7, panel a). Furthermore, the risk of disorderly falls in asset prices has increased due to tighter financial conditions, heightened credit risk, muted growth prospects and ongoing geopolitical tensions (Chart 7, panel b). Such price corrections could pose challenges for investment funds and OFIs, including the potential for large margin

calls. Additionally, systemic liquidity risks are emerging, characterised by liquidity strains in specific market segments and collateral shortages, as seen in August 2024 in US and Japanese equity markets in a context of carry trade strategies by hedge funds (see Special Feature 3). These conditions could lead to spikes in price volatility, further complicating the operational landscape for investment funds. Collectively, these cyclical risks necessitate close monitoring and strategic interventions to mitigate their potential impact on the financial ecosystem (Figure 2). Monitoring may be difficult due to the multitude of business models non-banks employ. Special Feature 3 contains an example of data-driven monitoring related to hedge funds.

Chart 7

Corporate bankruptcy declarations and economic policy uncertainty



Sources: Eurostat, Federal Reserve Bank of St. Louis and ESRB calculations.
Note: Panel a): bankruptcy declarations issued by firms.

Risks related to the materialisation of macroeconomic vulnerabilities increased in 2024. Sovereign vulnerabilities within the euro area became increasingly pronounced in 2024. Heightened policy and geopolitical uncertainty, coupled with weak fiscal fundamentals and sluggish growth, have exacerbated these vulnerabilities. The persistence of primary deficits presents challenges to debt sustainability, yet the market pricing of euro area sovereign risk remains more benign than credit ratings would suggest. This discrepancy raises concerns about potential underestimations of risk exposure among non-banks. Political fragmentation, anaemic potential growth and ongoing geopolitical uncertainties are further intensifying these sovereign vulnerabilities.

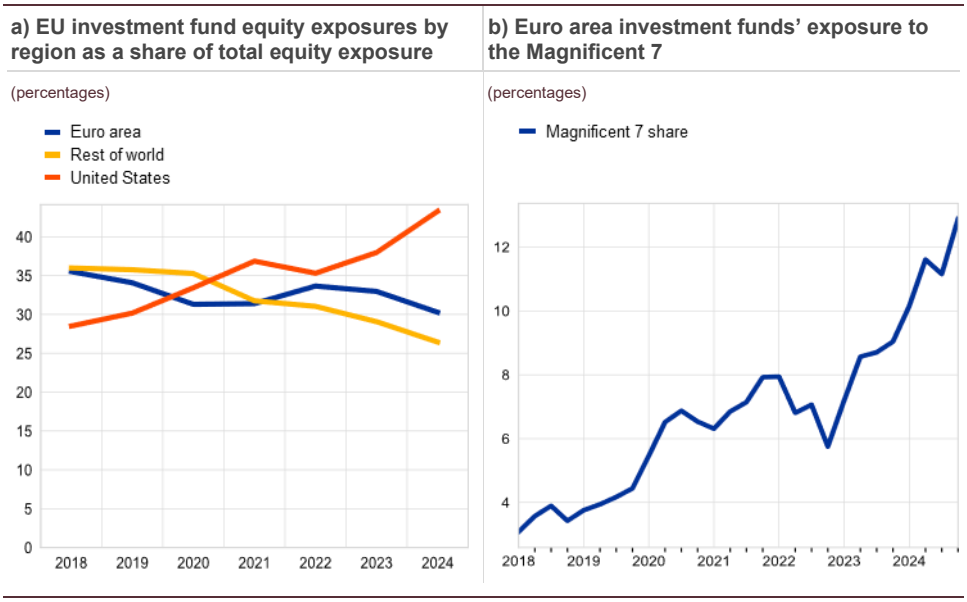
The risks of a disorderly fall in asset prices remain high. Stretched valuations in certain market segments could lead to disorderly declines in the prices of riskier assets. Credit spreads are nearing pre-global financial crisis lows, US stock market valuations have surged well above historical averages, while the discount of European stocks relative to their US counterparts has widened further. In addition, the high costs associated with AI investments, coupled with uncertain returns, are

fostering investor scepticism and increasing vulnerability to shocks. This is compounded by US banks holding substantial unrealised losses, which adds to the fragility of the financial landscape. Furthermore, any escalation in geopolitical tensions and political uncertainty could drive heightened asset price volatility.

Concerns over the concentration of EU non-banks' assets in the United States, particularly in AI stocks, grew in 2024. Persistent worries about the valuation of US technology stocks have raised concerns, especially given the potential for significant market spillovers in the event of sharp repricing. Valuation ratios for these stocks appeared elevated at the end of 2024, when compared with long-term averages, highlighting the risk of sudden price corrections. The increasing concentration of investment funds' portfolios in a relatively small number of technology stocks has heightened their vulnerability to such repricing events (Chart 8, panel b). Chart 8, panel a), shows that euro area-domiciled investment funds increased their exposure to US equities relative to their total assets in 2024, although a large proportion of this shift can be attributed to valuation changes rather than an active shift in investment profiles. Furthermore, the strong interconnectedness of the non-bank sector amplifies the risk, as disruptions could easily spill over into other critical markets, potentially destabilising the broader financial system.

Chart 8

European investment funds' exposure to US assets



Sources: ECB and ESRB calculations.
Note: The Magnificent 7 comprises the stocks of Alphabet, Amazon, Apple, Meta, Microsoft, Nvidia and Tesla.

Systemic liquidity risks remain high. The interaction between market and funding liquidity can amplify financial shocks. The August 2024 market turmoil, similar to the banking stress of March 2023, highlighted high sovereign bond market volatility, triggering collateral demands. These risks are worsened by reduced market liquidity, as uncertainty leads liquidity providers to withdraw and forced sales further depress asset prices. Non-bank financial sector vulnerabilities, particularly in highly leveraged investment funds with low liquidity buffers, could exacerbate market dynamics through forced sales and procyclical behaviour. Delays in monetary easing might

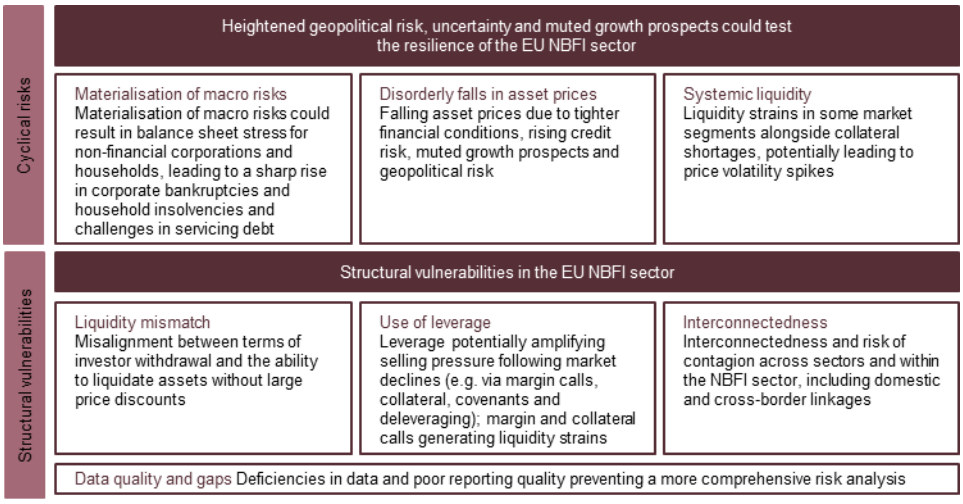
strain interest-sensitive sectors, potentially causing asset price drops. If these risks materialise, liquidity could dry up, leading to significant price corrections. In that context, the European Systemic Risk Board (ESRB) recently published a report providing a monitoring framework for systemic liquidity risk.[16]

Systemic risks in the EU real estate market remain elevated, with distinct challenges in both residential and commercial sectors. In residential real estate, house price recovery suggests reduced risk of a significant downturn, yet high household indebtedness persists in some countries. Commercial real estate (CRE) continues to face vulnerabilities, despite lower interest rates. Key challenges include transitioning to environmentally efficient buildings, especially for non-prime office spaces. While CRE prices have stabilised in some areas, transaction volumes vary widely across Europe. For REIFs, the risk of sharp corrections has diminished, but macroeconomic shocks could still lead to disorderly market adjustments, affecting funds with high CRE exposure. The outlook for 2025 depends on the sector's ability to adapt to operational challenges and shifts in economic conditions.

Cyclical risks can be amplified by structural vulnerabilities of non-bank financial intermediaries. Liquidity mismatch, use of leverage and interconnectedness can contribute to systemic risk, amplifying and spreading shocks throughout the financial system. These vulnerabilities apply not only to investment funds and OFIs, but also to crypto-assets and their associated intermediaries (Figure 2 and Section 1.3).

Figure 2

Risks and vulnerabilities in EU non-bank financial intermediation



Source: ESRB.

[16] European Systemic Risk Board (2025), "Systemic liquidity risk: a monitoring framework", February.

1.3 Key vulnerabilities

Excessive leverage is a significant vulnerability for non-banks. Leverage amplifies existing risks, such as liquidity and market risks. The use of derivatives to achieve synthetic leverage or reliance on the repo market for financing can lead to margin calls or collateral demands when adverse price movements occur. In these situations, the crystallisation of market risk leads to greater losses due to increased exposure to market volatility and additional liquidity demands through margin or collateral requirements. Consequently, the need to deleverage positions may prompt fire sales, exerting further downward pressure on prices. Moreover, the use of leverage heightens counterparty exposures and interconnectedness within the financial system. Although high leverage is often associated with alternative investment funds (AIFs), it can also accumulate in some undertakings for collective investment in transferable securities (UCITS) that pursue hedge fund-like strategies. Special Feature 1 looks at risks in highly leveraged AIFs, while Special Feature 2 discusses the use of leverage by UCITS employing a value at risk (VaR) approach.

The global increase in hedge fund leverage requires close monitoring. The increase in leverage in the United States and in the EU has been accompanied by a growing role played by hedge funds in core markets such as sovereign bonds and repo. Special Feature 1 discusses risks related to highly leveraged AIFs, including hedge funds. Special Feature 3 presents a market-based approach to analysing the exposure of hedge funds to particular strategies, useful for financial stability monitoring.

Real estate funds may not be heavily leveraged overall, but some of them use large amounts of financial leverage.[17] Only a small proportion of EU-domiciled real estate funds use leverage on a substantial basis, defined as exceeding 300% of NAV under the commitment method. Nonetheless, real estate funds do rely on borrowing, with loans comprising 14% of total liabilities. This is second only to hedge funds, which have recently overtaken real estate funds (Chart A14, panel a). In most jurisdictions, including the largest domiciles for real estate AIFs, funds depend on domestic intermediaries to facilitate borrowing.[18] This use of leverage increases interconnectedness between real estate funds and banks and may give rise to wrong-way risks, as most bank loans are collateralised by real estate assets, as analysed in more detail in Special Feature 4. In addition to direct borrowing, real estate funds can also employ leverage indirectly through special-purpose vehicles (SPVs) and CFIs. These exposures increase the overall level of leverage in the financing chain and should be captured by the reporting framework for AIFs.[19] Special Feature 5 looks in more detail into the interconnectedness between CFIs in Luxembourg and real estate funds.

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17 Excluding private equity and private debt funds for which no information is collected under the AIFMD on indebtedness along the investment chain.

18 See European Securities and Markets Authority (2023), "Real estate markets – Risk exposures in EU securities markets and investment funds", *TRV Risk Analysis*, January.

19 See Article 6.3 of Commission Delegated Regulation (EU) No 231/2013 of 19 December 2012 supplementing Directive 2011/61/EU of the European Parliament and of the Council with regard to exemptions, general operating conditions, depositaries, leverage, transparency and supervision (OJ L 83, 22.3.2013, p. 1).

Liquidity mismatch remains an important structural vulnerability in investment funds. Investment funds continue to engage in substantial liquidity and maturity transformation, although to a somewhat lesser extent. Most EU-domiciled investment funds are open-ended (comprising 90.4% in terms of net assets) and offer frequent redemption opportunities. The degree of liquidity mismatch varies and depends on specific redemption terms and conditions, including liquidity management tools. Some open-ended funds invest in less liquid instruments and, especially during periods of stress when faced with large investor redemptions, may engage in procyclical selling, thereby exacerbating price movements in underlying markets.

There are large differences in the use of liquidity transformation across different groups of investment funds. On the one hand, equity funds typically engage in minimal liquidity transformation, as the assets they invest in are usually traded in deep and liquid markets (Chart A13, panel a). On the other hand, real estate funds invest in inherently illiquid assets, and their liquidity transformation is influenced by the frequency and terms of redemptions. Bond funds also engage in liquidity transformation to varying degrees, depending on the liquidity of the fixed income instruments they hold, with generally higher liquidity transformation for corporate bond funds than for funds investing in sovereign bonds. Their level of liquidity transformation remained broadly stable between the end of 2023 and the end of 2024 (Chart A13, panel a). MMFs do not perform much liquidity transformation compared with other open-ended funds. However, their use as cash management vehicles makes them prone to redemption risks. MMFs maintained high levels of liquid assets in 2024, with weekly liquid assets at 47% of NAV, above regulatory requirements but falling since 2023 (Chart A19, panel b). However, the increasing share of LVNAV MMFs heightens the risk of cliff effects if a fund is unable to maintain its fixed NAV within the 20 basis point collar. The large role of non-EUR-denominated MMFs, whose share rose to 55% compared with 48% in 2023, also amplifies cross-currency interconnectedness within the EU MMF sector.

Liquidity risk arising from the use of derivatives, particularly through margin calls, constitutes a significant vulnerability for NBFI. Derivative positions can expose institutions to sudden and substantial liquidity demands when market conditions change, necessitating swift collateral adjustments. Such margin calls can strain liquidity resources, forcing entities to liquidate assets at unfavourable prices, thereby exacerbating market stress. The increasing complexity and volume of derivative transactions within the sector amplify this risk, as institutions are often interconnected through these instruments, further heightening the potential for systemic contagion. This concern is especially pertinent in light of upcoming regulatory changes, such as the pension reform in the Netherlands, given their large footprint in interest rate derivatives markets. As discussed in Special Feature 5, the reform could notably affect derivatives markets by altering pension funds' demand dynamics and risk management strategies.

Interconnectedness is a key vulnerability for NBFI as it amplifies the potential for systemic risk within the financial system. Linkages between financial institutions can facilitate risk sharing and provision of credit to the real economy. But the extensive network of financial linkages among various entities, including

investment funds, insurance corporations, pension funds and OFIs, can also facilitate the rapid transmission of shocks across the sector. For a study aiming to understand the interconnectedness of CFIs with the wider financial system based on data for CFIs in Luxembourg, see Special Feature 5. This interconnectedness is particularly pronounced in the euro area, where investment funds hold significant positions in each other's assets. Such interdependencies can lead to cascading effects during periods of financial stress, as distress in one part of the system can quickly affect others. Moreover, reliance on similar funding sources and investment strategies further compounds this risk, making the sector more susceptible to correlated losses. Effective monitoring and regulation of these interconnections are crucial to mitigate the risk of contagion and ensure the stability of the broader financial system. Data gaps also need to be tackled, as discussed later in the section.

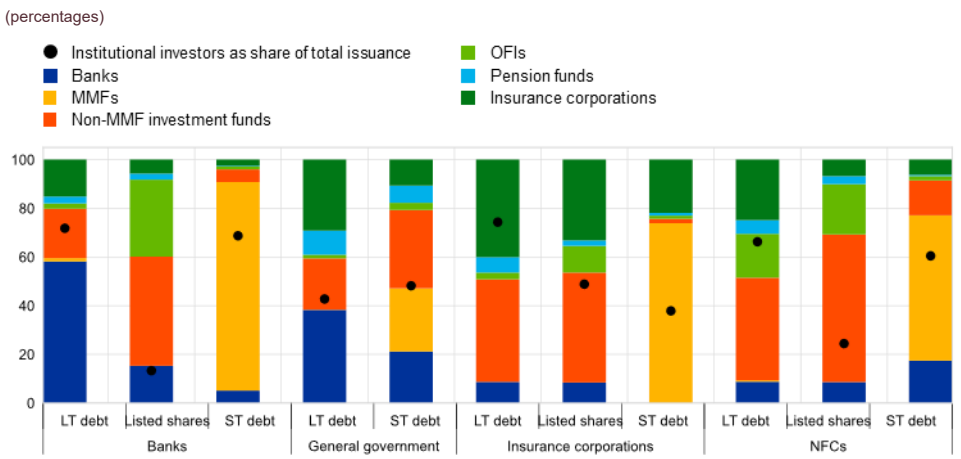
Investment funds are important participants in many markets for financial instruments (Chart 9). Among all euro area institutional investors, investment funds were the most important holders of long-term debt instruments and listed shares issued by euro area NFCs in 2024, as well as listed shares issued by euro area banks and insurers.[20] Their share in the market for long-term debt instruments issued by euro area banks and insurers held by investment funds was also considerable, though it was smaller than the share held by banks and insurance corporations. Euro area MMFs held a substantial proportion of all euro area private short-term debt instruments. This significant market presence highlights the important role investment funds can play in the savings and investments union in the EU. At the same time, it points to potential vulnerabilities, as they can have an outsized effect on markets, underscoring the need for a system-wide approach to macroprudential policy.[21]

[20] It is worth noting that investment funds invest on behalf of their clients, and an analysis of ultimate investors may yield different results.

[21] For more details, see European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

Chart 9

Securities holdings by holder sector, issuer sector and instrument type



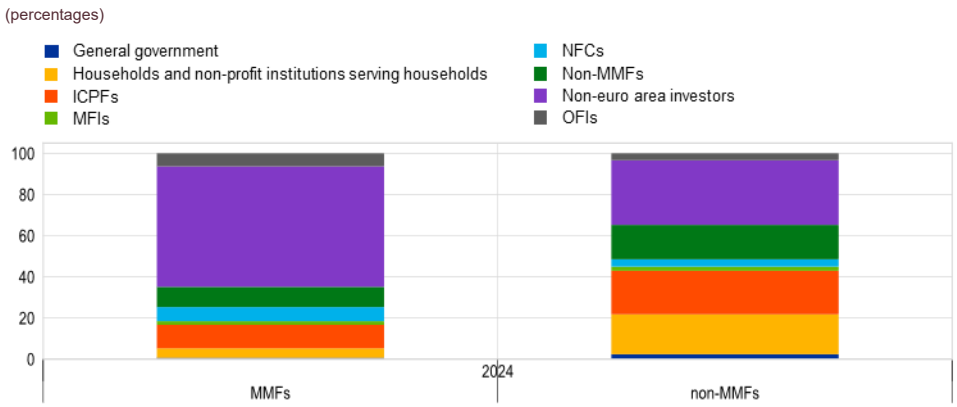
Source: ECB (SHSS).
Notes: Legend indicates holder sector. X-axis shows instrument type and issuer sector. LT stands for long-term and ST for short-term.

Exposures within the NBFI sector remain high, with the potential to spread shocks. On the assets side, funding provided by investment funds to various sectors in the euro area has increased substantially (Chart A16, panel a). Notably, interconnectedness within the NBFI sector has consistently grown at least since the relevant data became available. In particular, the holdings of euro area investment funds in shares of other non-MMF investment funds in the euro area has increased to 22% of total assets, up from 14% in 2009. These holdings grew by 16% throughout 2024, reaching €4.2 trillion at the end of the year (Chart A16, panel a). This trend is related to the use of exchange-traded funds (ETFs) as liquid assets by funds as well as the growth of the funds of funds sector. Similarly, the holdings of instruments issued by insurance corporations grew by 16%, reaching almost €106 billion at the end of 2024. The holdings of euro area banks increased by 12% to €881 billion at the end of 2024. On the liabilities side, euro area MMFs are primarily funded by non-euro area investors, who held over 58% of shares at the end of 2024.[22] For non-MMF investment funds, a significant proportion of investors are euro area households and insurance corporations and pension funds (ICPFs), holding almost 20% and over 21% of euro area non-MMF funds at the end of 2024 respectively (Chart 10).

[22] This reflects in large part the dominance of non-EUR-denominated (USD and GBP-denominated) MMFs in Ireland and Luxembourg.

Chart 10

Investors in euro area investment funds



Source: ECB. Data refers to 2024.

Direct and indirect linkages between investment funds, OFIs and the banking sector remained stable in 2024. Wholesale funding provided by euro area investment funds and OFIs grew marginally throughout 2024, accounting for just over 9% of total liabilities in the euro area banking sector at the end of 2024 (Chart A8). Investment funds' funding to banks is primarily provided by MMFs, with assets issued by monetary financial institutions (MFIs) remaining stable at around 70% of their holdings. Other types of funds are much less exposed, with hedge funds holding 14% and bond funds holding 11% of their total assets (Chart A16, panel b). This funding increased by 10% year on year, primarily due to the rise in value of bank debt securities held by investment funds and MMFs, which reached over €3.1 trillion at the end of 2024 (Chart A8). Deposits from investment funds and OFIs remained stable at around 6% of bank liabilities at the end of 2024 (Chart A9, panel b). However, the share of funds' deposits in banks is heterogeneous across jurisdictions, with funds playing a more prominent role in bank funding in large asset management centres such as Luxembourg and Ireland. More substantial linkages could lead to potential spillover effects if investment funds were to withdraw deposits in times of stress, warranting close monitoring. Bank exposures to investment funds and OFIs on the assets side grew slightly in 2024, with loans issued to investment funds and OFIs, combined with their equity and debt instruments held by banks, standing at 7.6% of banks' total assets at the end of the year, compared with 7.3% a year earlier (Chart A9, panel a). Indirect linkages between sectors may also manifest as ownership ties, as most of the largest asset management companies operating in the EU are owned by banks (Chart A15).

Vulnerabilities related to liquidity transformation, leverage and interconnectedness are also present in crypto-asset markets. Many stablecoins perform liquidity transformation by offering on-demand redemption to their holders, while their reserves – which are typically composed of traditional financial assets – are not always fully invested in highly liquid instruments.[23] A run on a stablecoin

[23] In the EU, MiCAR introduces stringent requirements for stablecoin issuers, including prudential and governance rules, as well as obligations regarding the composition and management of stablecoin reserves, with a view to mitigate the risks of those instruments.

could trigger the fire sale of its reserve assets, leading to a downward spiral with potentially wider repercussions for traditional financial markets. Stablecoin issuers (such as Tether and Circle) back their tokens with US Treasury bills and money market assets, making them key players in short-term debt markets. Crypto exchanges offer margin trading and derivatives instruments with high embedded leverage, sometimes up to 100x or even more. Highly leveraged exposures risk amplifying negative wealth effects for investors in the event of a price decline. Close business relationships and reliance on the same technology and infrastructure contribute to high interconnectedness among crypto firms. Consequently, contagion risk within crypto-asset markets is high and could spill into traditional markets, for instance through the exposure of traditional firms to crypto-assets or crypto firms.

Data gaps, poor-quality data and limited legal scope for sharing hinder authorities' ability to fulfil their financial stability mandates effectively. Deficiencies in both regular and high-frequency reporting frameworks, particularly during crises, obstruct comprehensive risk assessment and complicate the addressing of financial stability risks. Notably, several datasets used in this report, including the ECB's statistics on investment fund balance sheets and securities holdings, lack full EU coverage. Visibility in the AIF sector remains constrained, especially concerning leverage use by private equity funds. Different reporting frequencies and time lags in data provision further complicate risk monitoring. Data gaps for some parts of the asset management sector at large remain substantial, preventing authorities from having a system-wide view of the financial system.[24] This includes discretionary mandates, where clients delegate the management of their portfolio to an asset manager without using a collective investment structure like an investment fund. Discretionary mandates have expanded recently, including in the Netherlands as pension funds move from funds to mandates (see Box 2). Large data gaps persist in the OFI domain, particularly for CFIs and OFI residuals, following the discontinuation of data collection for financial corporations engaged in lending (FCLs) at the euro area level. Additionally, insufficient data-sharing arrangements among authorities impede policy coordination. Although data quality has improved with significant advancements recently, further efforts are required.

The monitoring framework considers how investment funds, OFIs and parts of the crypto ecosystem are involved in certain risky activities and how these activities might have an impact on financial stability. Tables 1 and 2 provide an overview of such risky activities carried out by the entities, crypto-assets and associated intermediaries considered in this report, including liquidity and maturity transformation, use of leverage and credit intermediation, along with their interconnectedness with the banking sector. The level of engagement in these activities does not necessarily translate to a measure of risk. The assessment of the level of engagement is informed by descriptive statistics and market intelligence but is ultimately judgement-based. It is reviewed and updated on an annual basis and incorporates improved data availability and regulatory developments. A more

[24] See European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

detailed analysis is presented throughout Section 1, followed by activity-based monitoring, which is covered in Section 3.

There has been no material change in the engagement of investment funds and OFIs in risky activities since the last monitor. Hedge funds and FVCs, as well as security and derivative dealers (SDDs), engage extensively in the risky activities considered in this report (Table 1). Bond funds, private debt funds and MMFs, as well as special-purpose entities (SPEs) and FCLs, have a medium engagement. The engagement of equity funds, mixed funds (investing in equities and bonds), private equity funds and ETFs is low on average.

Table 1

Mapping of activities to entity types – investment funds and OFIs

	Investment funds											OFIs			
	MMFs			Bond funds											
	CNAV	VNAV	LVNAV	Corporate	Sovereign	Mixed funds	Equity funds	Hedge funds	RE funds	ETFs	PE funds[4]	PD funds	FVCs	SPEs	SDDs	FCLs
Market size																
Euro area size (EUR trillions)	0.2	0.7	1.0	4.0		3.8	6.3	0.4	1.1	2.1	0.7	n/a	2.5	n/a	n/a	n/a
Annual growth (%)	17	5	25	12.9		8.5	19.7	9.1	2.0	33.8	13.4	n/a	5.5	n/a	n/a	n/a
Summary assessment																
Engagement	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
Risk transformation activities																
Credit intermediation	●	●	●	●	●	●	○	●	○	○	●	●	●	●	○	●
Maturity transformation	●	●	●	●	●	●	○	●	●	●	○	○	●	●	●	●
Liquidity transformation	●	●	●	●	●	●	○	●	●	●	○	○	●	●	●	●
Leverage[2]	○	○	○	●	●	●	○	●	●	○	●	●	●	●	●	●
Market activities[1]																
SFTs	●	●	●	●	●	●	●	●	○	●	○	○	○	○	●	○
Derivatives	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	○
Reuse of collateral	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	○
Interconnectedness																
Interconnectedness[3]	●	●	●	○	○	○	○	●	●	●	○	○	●	●	○	●

Source: ESRB.
Notes: The table summarises the assessment of engagement, where the shapes reflect the intensity of the possible institutional engagement in the relevant areas of activity, according to the coding specified in the notes below. The coding is judgement-based and informed by market intelligence and quantitative evidence. Owing to data limitations and a lack of consistent data, the assessment does not distinguish between consolidated and non-consolidated entities. The geographical coverage of the table refers to entities domiciled in the EU. MMFs stands for money market funds, CNAV for constant net asset value, VNAV for variable net asset value, LVNAV for low-volatility net asset value, FVCs for financial vehicle corporations (non-retained securitisations), SPEs for special-purpose entities, SDDs for security and derivative dealers and FCLs for financial corporations engaged in lending. Data on the size and annual growth of EU PD funds, SPEs and SDDs and FCLs are no longer available (n.a.). Size in case of funds denotes total value of fund shares.
1) Market activities through which risk transformation can be undertaken by investment funds and OFIs can take various forms. The list focuses on those market activities deemed to be most susceptible to risks.
2) Leverage refers to financial leverage and not to leverage that is created synthetically through the use of derivatives.
3) Direct and indirect interconnectedness with the banking system based on asset and liability data and staff assessment.
4) While credit intermediation and leverage at the fund level may be low, private equity funds can facilitate credit and leverage in the financial system by engaging in leveraged buyout transactions.
Coding: ●=pronounced engagement; ●=medium engagement; ●=low engagement; ○=unlikely or insignificant engagement.

The assessment of crypto-assets and associated intermediaries highlights their engagement in liquidity transformation, leverage and reuse of collateral (Table 2). Most stablecoins are pegged to fiat currencies and backed by fiat-denominated reserve assets. They share similarities with MMFs as they offer liquidity on demand while investing in short-term instruments with differing degrees of liquidity. Centralised finance (CeFi) covers crypto exchanges and other platforms which typically offer leverage through derivatives or margin lending and provide other types of investment or lending services that often involve collateral and subsequent collateral reuse (which are considered securities financing transaction (SFT) activities). Decentralised finance (DeFi) relies on autonomous protocols, where crypto-assets are locked in "liquidity pools" and are used to trade against, or are lent to, other entities via collateralised borrowing. The reuse of collateral is a key characteristic of DeFi due to its inherent composability (i.e. the capacity to combine several different protocols). For the three segments of the crypto-asset market covered here, interconnectedness within the crypto ecosystem is high whereas linkages with the traditional financial system are low at present.

Table 2

Mapping of activities to crypto-assets and associated intermediaries

	Stablecoins	CeFi	DeFi
Market size			
Global size (EUR billions)	204.5	205	115
Annual growth (%)	+72.6	+35	+130
Summary assessment			
Engagement	●	●	●
Risk transformation activities			
Credit intermediation	●	●	●
Maturity transformation	●	●	●
Liquidity transformation	●	●	●
Leverage	○	●	●
Market activities[1]			
SFTs	○	●	●
Derivatives	○	●	●
Reuse of collateral	○	●	●
Interconnectedness			
Interconnectedness[2]	●	●	○

Source: ESRB.
Notes: The table summarises the assessment of engagement, where the shapes reflect the intensity of the possible institutional engagement in the relevant areas of activity, according to the coding specified in the notes below. The coding is judgement-based and informed by market intelligence and quantitative evidence. Owing to data limitations and a lack of consistent data, the assessment does not distinguish between consolidated and non-consolidated entities. Due to data gaps, the geographical coverage of the table does not refer to the EU level but to the global level instead. Caveats on the availability and quality of data are important, particularly as most data are gathered from commercial sources. Furthermore, there are concerns over the validity of market value figures and trading volumes. Data pertaining to size refer to the market value for stablecoins, the amounts of reserves on crypto exchanges (including assets under custody) for CeFi and total value locked for DeFi at the end of 2024.
1) Market activities through which risk transformation can be undertaken in the crypto-asset universe can take various forms. The list focuses on those market activities deemed to be most susceptible to risks.
2) Direct and indirect interconnectedness with the traditional financial system based on asset and liability data and staff assessment.
Coding: ●=pronounced engagement; ●=medium engagement; ●=low engagement; ○=unlikely or insignificant engagement.

Box 2
Dutch pension fund reform

As the Dutch Future Pensions Act (WTP)[25] takes effect, the Netherlands is embarking on a transition from a defined benefit pension framework to a defined contribution system. Effective from 1 July 2023, this reform marks a substantial shift in the Dutch pension landscape, with a complete transition to be achieved by 1 January 2028. Dutch pension funds are significant users of interest rate derivatives to mitigate interest rate risk, ensuring consistent future pension payments. The liabilities of Dutch pension funds, which consist of future pension benefit payments, are largely due in the distant future. Market interest rates determine the amount pension funds must set aside to be able to pay future pension benefits. Consequently, fluctuations in interest rates greatly affect the financial position of pension funds. Pension funds aim to maintain a stable coverage ratio, which measures the pension fund's ability to meet its future obligations, calculated by comparing the value of its assets with that of its liabilities. Interest rates significantly influence these ratios because the maturity of assets tends to be lower than the maturity of their liabilities (duration mismatch). When interest rates fall, the present value of pension liabilities tends to increase more than that of investments, resulting in a lower coverage ratio. This exposes pension funds to interest rate risk. Pension funds use interest rate swaps to hedge against the risk of lower interest rates: they pay a floating rate and receive a fixed rate so that any decline in market rates results in a mark-to-market gain on their positions.

The events of March 2020 highlighted the significant role Dutch pension funds play in financial market dynamics, driven by their substantial holdings of interest rate derivatives. During this period, market developments led to considerable fluctuations in variation margin (VM, obligations that arise from changes in derivative values), with the amounts estimated to have reached nearly €50 billion between 11 and 23 March 2020. More than 90% of this VM was posted by Dutch insurance corporations and pension funds (ICPFs). Dutch entities accounted for approximately 60% of the notional value of derivatives held by euro area ICPFs, followed by French (insurance corporations only, 12%), Finnish (9%) and German (8%) entities. The impact on their value was further amplified by the exceptionally long duration of the swaps held by Dutch ICPFs, which had an average residual maturity of around 14 years – significantly longer than the seven-year average for other euro area ICPFs – making their value particularly sensitive to interest rate fluctuations.[26]

Stress tests demonstrate that Dutch pension funds can meet margin calls on derivatives, but they depend on functioning money markets. A study by the Autoriteit Financiële Markten (AFM) indicated that, had the stress levels experienced in March 2020 been more severe, some pension funds might have encountered liquidity problems. Liquidity strains were narrowly avoided, in part due to central bank

[25] Wet Toekomst Pensioenen.

[26] See European Central Bank (2020), "Interconnectedness of derivatives markets and money market funds through insurance corporations and pension funds", *Financial Stability Review*, November.

interventions.[27] An analysis by De Nederlandsche Bank (DNB) and the AFM, prompted by a recommendation from the Dutch Financial Stability Committee (FSC), concluded that even in the face of a large, sudden drop in derivative values, Dutch pension funds possess sufficient liquidity sources to meet margin calls. However, their ability to do so critically hinges on the continued smooth functioning of short-term funding markets (money markets and repo), which allows them to raise cash quickly when needed.[28]

Currently, concerns surrounding interest rate derivatives have shifted from margin calls to the challenges of unwinding positions during the upcoming transition to a new pension system. Pension funds are in the process of transitioning to a defined contribution pension system, which involves the distribution of total assets, including the buffers that are maintained by the coverage ratio. Dutch pension funds have increased their interest rate hedges, with average interest rate protection rising from 37% to 64% between 2021 and 2024.[29] Dynamic hedging polices, in which the level of hedging increases with higher interest rates, explain part of the rise. However, more recently the main reason for most pension funds to increase the interest rate hedge is to mitigate the adverse effects of interest rate changes on coverage ratios in anticipation of the transition to the new system. This enhancement reduces the negative impact of declining interest rates and helps maintain a stable coverage ratio, ensuring that sufficient buffers are available to be redistributed to participants as of the transition date.

A key element of the WTP is the shift from a collective pension system to a more age-dependent individual pension model. This requires pension funds to first (partially) distribute their collective pension capital to participants, a process known as “invaren”, or conversion.[30] As of 1 January 2025 the first three pension funds had already transitioned to the new system. The majority of Dutch pension funds, in terms of assets under management, are expected to follow suit in 2026 and 2027. Given the significant size of Dutch pension funds within the EU, this transition could have an impact on the financial system, as asset holdings and hedging strategies will need to be adjusted in line with the new arrangements.

The upcoming transition for Dutch pension funds involves critical modifications to interest rate hedging strategies, potentially affecting market liquidity and stability. As they move to the new system, many pension funds plan to reduce their strategic interest rate hedge, thereby decreasing their reliance on derivatives as of the transition date. This will result in less structural demand for

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27 Autoriteit Financiële Markten (2020), “Liquiditeitsrisico van margin calls in maart 2020”, *Occasional Papers*, December.

28 See De Nederlandsche Bank and Autoriteit Financiële Markten (2024), “Liquidity risks of pension funds’ derivatives portfolios under various stress scenarios”.

29 See De Nederlandsche Bank (2024), “Financial Stability Report”, autumn, and IPE (2024), “Dutch pension funds increase interest rate hedge above 70%”, 12 August.

30 Every pension fund currently has one large pension pot. The value of this pension pot is administratively distributed across the body of members (active members, non-active members and retired members). In the event of conversion, the pension entitlements members have accrued in the old system are converted into personal pension capital. This amount is then transferred to the new pension plan. Ultimately, each member will get their personal pension capital assigned to them. This does not directly affect the overall portfolio of assets, but changes to the portfolio will occur because pension funds are moving from a collective investment policy to life cycle investing for cohorts of members.

long-end euro duration assets, mainly in the 20-year to 30-year buckets.[31] A reduction of this structural demand by Dutch pension funds, due to their size, may lead to a structural steepening of the euro swap curve and thus the pricing of the term premium. Most pension funds will transition on 1 January 2026 or 2027, which coincides with a period typically characterised by lower market liquidity. Additionally, the simultaneous shift of numerous funds from the old framework (Financial Assessment Framework, FTK)[32] to the WTP framework, and their concurrent adjustments in interest rate hedging, could disrupt the interest rate markets. There are concerns among market participants that the market cannot absorb pension funds' sales of interest rate swaps and government bonds of Germany and the Netherlands around the transition date in 2026 and 2027.[33] Such disruption relates to a situation in which pension funds adjust their asset holdings immediately after the transition. If pension funds take more time to adjust their asset holdings, severe market disruptions could be avoided. Recognising this risk, the Minister of Social Affairs of the Netherlands recently decided that pension funds will be given more time to reduce their interest rate hedges once they have transitioned to the new pension system. This decision will allow pension funds to temporarily deviate from the strategic investment policy for a "smooth transition" to the new investment policy.

The ongoing reform of the Dutch pension system is driving a strategic pivot from collective investment funds to a more comprehensive asset management approach. This transition is reshaping the pension fund landscape, with some investment funds shifting away from fiduciary asset management to concentrate solely on pension administration, while others are expanding their fiduciary services for pension funds. The transition to the new system triggered consolidations as scale becomes important to run an efficient pension business. A significant transfer of pension fund wealth is occurring, moving from collective investment schemes to individual mandates. Since 2020 nearly €400 billion has been redirected from investment funds to mandates.[34] This trend aligns with the European Systemic Risk Board's call for a holistic perspective on asset management, emphasising the need to broaden policy discussions beyond traditional investment funds. As asset management practices extend beyond investment funds, the industry faces transparency challenges that necessitate a system-wide approach.[35]

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31 For more details, see PIMCO (2023), "The End of the Dutch Defined Benefit Model: A Steeper Euro Swap Curve Ahead", December.

32 Financieel Toetsingskader.

33 See Pensioen Pro (2025), "Markt kan verkoopgolf swaps rond transitiedatum niet aan", 24 March.

34 See De Nederlandsche Bank (2025), "Pension funds (macroeconomic)" and Pensioen Pro (2023), "Pensioenfondsen stappen over van fondsbeleggingen naar mandaten", 25 September.

35 See European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

1.4 Recent developments in the EU policy framework

In 2024 there were several policy and regulatory developments related to NBFI with potential implications for financial stability. This section provides a summary of the main developments, including the European Commission's consultation on macroprudential policies, the operationalisation of liquidity management tools for funds, the shortening of the settlement period in the EU and new crypto-asset regulation.

In May 2024 the European Commission launched a targeted consultation on macroprudential policies for NBFI. The consultation aimed to gather stakeholder views to assess the adequacy of the macroprudential framework for NBFI in the EU. The consultation focused on key vulnerabilities, such as unmitigated liquidity mismatches, excessive leverage and interconnectedness both within NBFI sectors and between non-banks and the banking sector. Additionally, the consultation sought views on how to improve coordination among macroprudential authorities within the EU. In March 2025 the Commission published a summary report of the targeted consultation outlining stakeholders' views on the matter.[36] The ESRB published a report which served as its response to the Commission's targeted consultation.[37] The ESRB urged the Commission to enhance financial market regulation by addressing reciprocity under the Alternative Investment Fund Managers Directive (AIFMD), improving EU policy cooperation, enabling European Supervisory Authority (ESA) oversight of systemic cross-border actors, increasing transparency in asset management, incentivising central clearing in government bond markets and implementing activity-based rules to manage borrower risks and exposure limits. The Eurosystem also published its response in November 2024.[38] There was broad support for efforts to improve systemic risk detection and monitoring and to enhance coordination among EU macroprudential authorities. In this context, there was also support for system-wide stress testing. The feedback to the consultation additionally highlighted the importance of data and the need to ensure data are shared effectively, efficiently and reciprocally between national and EU macroprudential authorities. The Commission has not proposed any legislative reforms following the consultation but concluded it will take stock of the feedback and use this to inform any future initiatives it may decide to adopt.

Following the revision of the AIFMD and the UCITS Directive enacted in March 2024, which introduced new liquidity management tool requirements for open-ended EU investment funds, the European Securities and Markets Authority (ESMA) initiated work on the operationalisation of these liquidity management tools. ESMA published two consultations seeking input on draft guidelines for the selection and calibration of liquidity management tools, as well as technical standards determining the characteristics of liquidity management tools for open-ended AIFs and UCITS. The latter defined the constituting element of each liquidity

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36 European Commission (2025), "Targeted consultation on the adequacy of macroprudential policies for non-bank financial intermediation (NBFI) – Summary report", March.

37 European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

38 Eurosystem (2024), "Eurosystem response to EU Commission's consultation on macroprudential policies for nonbank financial intermediation (NBFI)", November.

management tool, such as calculation methodologies and activation mechanisms. ESMA delivered the draft regulatory technical standards (RTS) and guidelines in April 2025.[39]

The European Commission recently proposed shortening the settlement period for EU transactions in transferable securities from two days (T+2) to one day (T+1).[40] This proposal aims to enhance settlement efficiency and bolster the resilience of EU capital markets, fostering deeper and more liquid markets. It also seeks to prevent market fragmentation and reduce costs linked to misalignment with global markets operating under T+1, thereby boosting EU market competitiveness. Expected benefits include increased automation, improved post-trade efficiency, reduced risks and lower margin requirements. The transition to T+1 settlement is targeted for 11 October 2027.

In the crypto space, the Markets in Crypto-assets Regulation (MiCAR) came into full effect on 30 December 2024.[41] MiCAR establishes uniform rules for the issuing, public offering and admission to trading of crypto-assets, as well as for the provision of services related to crypto-assets. It contains around 35 different mandates for delegated acts, regulatory technical standards and implementing technical standards. The ESAs, namely ESMA and the European Banking Authority (EBA), delivered these draft standards throughout 2024, and the Commission has since adopted several of them.

The European Commission launched a targeted consultation to assess the effectiveness of the EU securitisation framework.[42] Despite improvements in transparency and standardisation, significant issuance and investment barriers persist, limiting the EU economy's ability to fully benefit from securitisation. The consultation, which closed in December 2024, addressed various relevant topics. A feedback statement was published in early 2025 to summarise the responses, which will guide the Commission's preparatory work for the upcoming review of the framework.[43]

At the global level, several initiatives relevant to financial stability for NBFI were launched in 2024. The Financial Stability Board (FSB) published a consultation on policy measures to address leverage in non-banks.[44] The consultation closed in February 2025. In December 2024 the Basel Committee on Banking Supervision (BCBS) issued final guidelines for counterparty credit risk (CCR) management, emphasising due diligence, risk mitigation strategies and robust

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39 See the following announcement.

40 See Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 909/2014 as regards a shorter settlement cycle in the Union.

41 Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 (OJ L 150, 9.6.2023, p. 40). Note there are transitional periods, in some cases up until mid-2026.

42 European Commission (2024), "Targeted consultation on the functioning of the EU securitisation framework", October.

43 European Commission (2025), "Targeted consultation on the functioning of the EU securitisation framework – Factual summary report", February.

44 Financial Stability Board (2024), "Leverage in Non-bank Financial Intermediation – Consultation report", December.

governance frameworks. These guidelines address shortcomings in banks' management of CCR, highlighted by recent NBFI distress.[45] Additionally, in December 2024 the FSB released a report on enhancing liquidity preparedness for margin and collateral calls in derivatives and securities markets.[46]

There were also initiatives relevant to crypto and securitisation at the global level. The FSB is evaluating the implementation by FSB members of its global regulatory framework, which includes recommendations for regulating and overseeing crypto-asset activities and markets and global stablecoin arrangements. In this context, the FSB called for stakeholder feedback on the impact of and experiences with jurisdictional frameworks.[47] Additionally, the FSB published a final report evaluating the impact of the G20 financial regulatory reforms on securitisation, highlighting improved transparency and stronger regulatory capital treatment for banks' securitisation exposures, and focusing on collateralised debt and loan obligations and residential mortgage-backed securities (RMBSs).[48]

45 Basel Committee on Banking Supervision (2024), "Final guidelines for counterparty credit risk management", December.

46 Financial Stability Board (2024), "Liquidity Preparedness for Margin and Collateral Calls: Final report", December.

47 Financial Stability Board (2025), "Thematic Peer Review on FSB Global Regulatory Framework for Crypto-asset Activities", February.

48 Financial Stability Board (2025), "Evaluation of the Effects of the G20 Financial Regulatory Reforms on Securitisation: Final report", January.

2 Special features

The monitoring presented in the previous section has identified significant risks stemming from leverage, liquidity mismatch and interconnectedness. Leverage remains a pressing concern, particularly as hedge funds globally heighten their leverage ratios, which could potentially amplify financial instability during market stress. Rising interest rates have challenged real estate funds, affecting valuations and prompting considerable redemption requests in some areas, thereby revealing liquidity management weaknesses. Additionally, the interconnectedness, especially through captive financial institutions (CFIs) and their ties with other financial entities, can pose systemic risks. Disruptions in this interconnected web can quickly propagate throughout the financial system, threatening the broader economic environment.

This section delves into these identified risks by concentrating on specific areas of concern. The first set of special features focuses on risks related to leverage in the EU fund sector, looking at both alternative investment funds (AIFs) and highly leveraged UCITS, but also at the global hedge fund sector given its increasing role in EU markets. The second set of special features analyses risks related to interconnectedness within the EU financial sector, by looking at interlinkages between real estate funds and banks and by describing the links between CFIs and the financial sector, including real estate and private equity funds.

2.1 Assessing risks in leveraged AIFs[49]

Excessive leverage in investment funds can create vulnerabilities that might spill over into wider markets and threaten financial stability. Leverage can amplify the impact of market and funding shocks on funds. If a fund holds large positions in an asset or asset class relative to the market, or if a sufficiently large number of similar funds experience shocks simultaneously, these shocks could be amplified, even if they were initially moderate. Past stress episodes involving highly leveraged entities underscore the need for a deeper analysis of leverage, including in AIFs. Examples of such episodes include the collapse of Long-Term Capital Management (LTCM) in 1998[50], the role of hedge funds in the government bond turmoil in March 2020[51], the default of the family office Archegos in 2021[52] and the role of liability-driven investment (LDI) funds in the 2022 gilt market crisis.[53]

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49 For further details, see also Bouveret et al. (2025), "Containing risks from leverage in alternative investment funds", *Occasional Paper Series*, ESRB, forthcoming.

50 See Edward, F.R. (1999), "Hedge Funds and the Collapse of Long-Term Capital Management", *Journal of Economic Perspectives*, Vol. 13, No 2, pp. 189-210.

51 See Kruttli et al., op. cit.

52 See Bouveret, A. and Haferkorn, M. (2022), "Leverage and derivatives – the case of Archegos", *TRV Risk Analysis*, No 50-165-2096, ESMA, May.

53 See Dunne, P., Ghiselli, A., Ledoux, F. and McCarthy, B. (2023), "Irish-Resident LDI Funds and the 2022 Gilt Market Crisis", *Financial Stability Notes*, No 7, Central Bank of Ireland, September.

Addressing vulnerabilities from excessive leverage requires a thorough understanding of leverage in funds from a macroprudential perspective. AIFs typically face no regulatory restrictions on the level of leverage they can employ. However, Article 25 AIFMD allows authorities to impose leverage limits or other restrictions on leveraged funds to safeguard financial stability.[54] To effectively use such powers, authorities need to understand the role leverage can play in the propagation of stress by investment funds. This understanding can be constrained by lack of and/or poor data, the complex nature of business models and interconnections between market participants.

This special feature analyses AIF leverage. Leverage can take two forms: financial leverage, which arises from borrowing, including through SFTs such as repos, and synthetic leverage, which is related to exposures obtained through derivatives. This special feature measures both and assesses leverage-related risks using simple metrics and a stress scenario involving an interest rate shock. It examines the use of leverage and the resilience to shocks of EU-domiciled funds with a gross leverage ratio above 300% of NAV. The framework lays the foundation for discussions on ex ante policy options, informing the use of Article 25 AIFMD and potentially guiding the development of future targeted tools and measures.

AIFMD, SFTR and European Market Infrastructure Regulation (EMIR) data provide information on leveraged funds. Data from the end of 2023 are used to identify EU-domiciled funds with a gross leverage ratio above 300% of NAV.[55] The sample of 655 funds is further divided into three subcategories, based on the AIF type and the primary strategies reported by the funds (Table 3). The first group consists of hedge funds, which include those pursuing relative value strategies. The second group comprises funds following LDI strategies. These funds are identified using keywords in their names and feedback from national competent authorities (NCAs).[56] LDI funds are further grouped by currency, as EUR and GBP funds have different types of exposures. Finally, a third group consists of funds that do not fit into the previous two categories.[57] The details of the methodology are found in an ESRB occasional paper.[58]

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54 For further details on the Article 25 framework and the annual risk assessment done by NCAs and ESMA, see European Securities and Markets Authority (2024), "Assessing risks posed by leveraged AIFs in the EU", *TRV Risk Analysis*, January.

55 See ESMA guidelines on reporting obligations under Articles 3(3)(d) and 24(1), (2) and (4) of the AIFMD. Article 111(1) of Commission Delegated Regulation (EU) No 231/2013 defines substantial leverage as leverage according to the commitment method above 300% of NAV. Because of poor data quality with this leverage metric, gross leverage is used instead to select a sample of highly leveraged funds.

56 For further information on LDI funds, see also the special feature entitled "Stress associated with liability-driven investment strategies" in European Systemic Risk Board (2023), "EU Non-bank Financial Intermediation Risk Monitor 2023", June. The sample of LDI funds is consistent with this special feature.

57 This group consists of funds with a diverse set of business models, including fixed income and mixed funds that use derivatives.

58 Bouveret et al. (2025), "Containing risks from leverage in alternative investment funds", *Occasional Paper Series*, ESRB, forthcoming.

Table 3

Sample of "substantially leveraged" AIFs

	Hedge funds: other	Hedge funds: relative value	LDI funds: EUR	LDI funds: GBP	Other funds	Total
NAV (EUR billions)	12	2	17	68	75	173
AuM (EUR billions)	167	56	93	349	383	1,047
Number of AIFs	79	17	42	180	337	655

Source: ECB (AIFMD).
Notes: The sample consists of EU-domiciled funds with an LEI and with a gross leverage ratio above 300% of NAV. Feeder funds and below-threshold funds that are subject to less comprehensive reporting obligations are excluded. EUR and GBP refer to the base currencies of the funds. NAV stands for net asset value and AuM for assets under management.

There are large differences in the level of leverage in AIFs across various fund types and strategies. Hedge funds, particularly those employing relative value strategies, exhibit some of the highest leverage ratios in the sample, with gross leverage often exceeding 30 times their NAV (Chart 11, panel a).[59] This high level of leverage is intrinsic to their business model, which seeks to exploit small pricing discrepancies across securities through arbitrage. Financial or synthetic leverage enables these funds to increase their positions and thereby generate substantial returns from small pricing discrepancies. However, it also magnifies their losses when price discrepancies widen.

LDI funds use leverage to achieve liability-matching objectives, albeit at lower levels than hedge funds. As of 2023 LDI funds exhibited average gross leverage ratios of five times their NAV and average net leverage ratios (accounting for netting and hedging) of three times their NAV.[60] These funds aim to manage long-term liabilities for institutional clients, such as pension funds, by employing derivatives to offset exposures to interest rate and duration risks. The significant use of interest rate swaps, especially among EUR-denominated LDI funds, and repo borrowing, particularly for GBP-denominated funds, highlights the central role of leverage in achieving these objectives. The reliance on financial and synthetic leverage in LDI funds underscores their potential to amplify shocks under adverse scenarios.

Synthetic leverage is a major type of leverage for both hedge funds and LDI funds. Hedge funds often use derivatives like interest rate, FX and credit swaps for their exposures, while LDI funds primarily focus on interest rate derivatives (Chart 11, panel c). Initial margins provide a clearer picture of the risks associated with this leverage, as they are designed to cover potential future exposures. High ratios of initial margins to NAV reveal significant synthetic leverage in hedge funds, particularly those with relative value strategies, and indicate greater derivative risks in EUR-denominated LDI funds compared with GBP-denominated ones (Chart 11, panel d). This highlights the importance of initial margins in assessing liquidity risks

[59] When the "commitment approach" is used to adjust for netting and hedging arrangements, leverage ratios for hedge funds with relative value strategies remain high, often exceeding 20 times the NAV.

[60] These averages are for the sample of highly leveraged funds and would be smaller for all funds.

and potential asset liquidations, making them crucial for systemic risk monitoring in leveraged investment funds.[61]

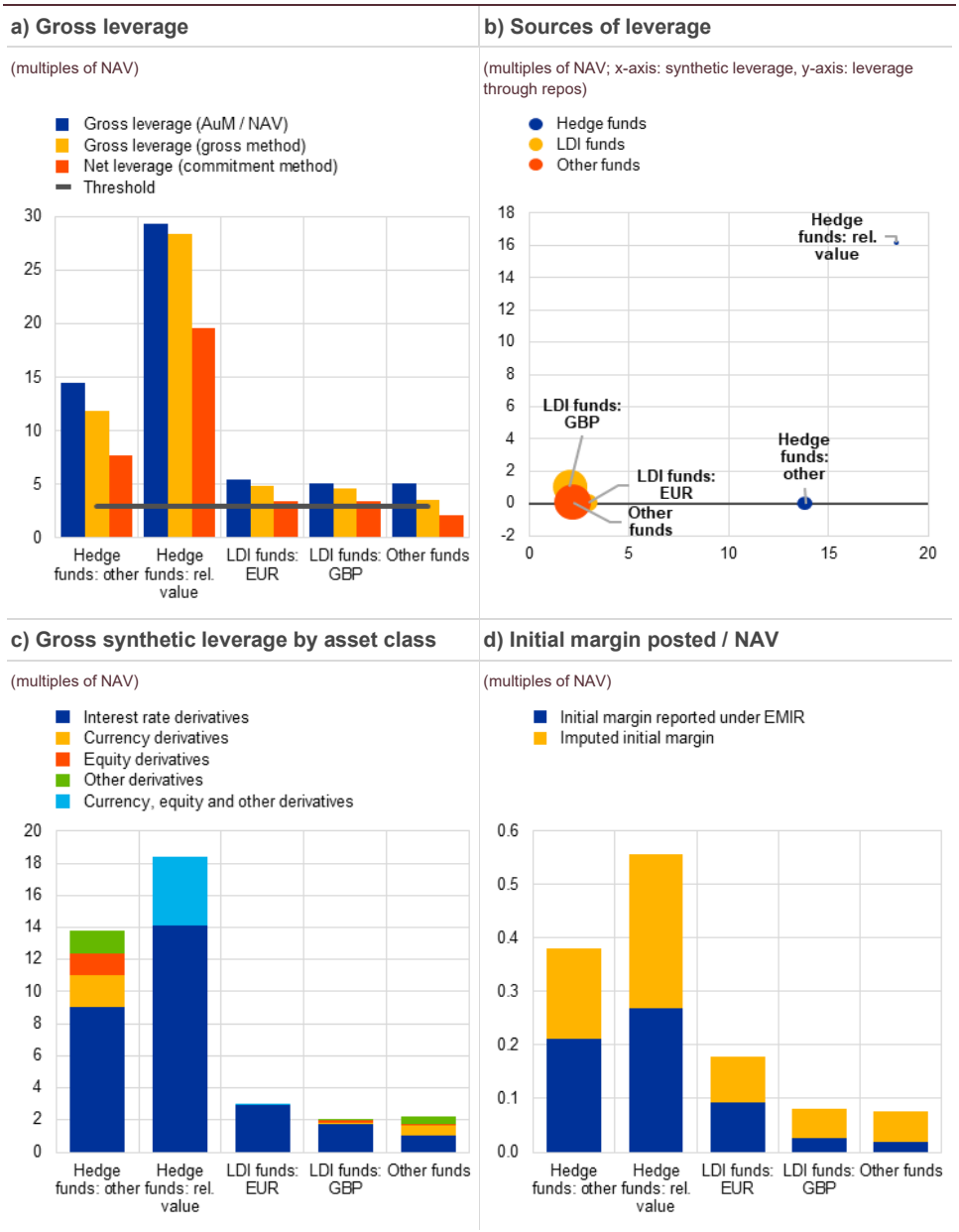
Financial leverage through repo borrowing further differentiates hedge funds and LDI funds. Hedge funds often borrow volumes exceeding their NAV, while GBP-denominated LDI funds rely less on repo borrowing (Chart 11, panel b). A key difference lies in collateral: LDI funds typically use high-quality government bonds, leading to low haircuts and greater leverage capacity. However, there is a significant overlap in the securities posted by GBP-denominated LDI funds. This similarity, combined with their substantial market presence in long-term and inflation-indexed UK sovereign bonds, creates a vulnerability for the underlying sovereign bond market.

The analysis shows that all types of leveraged AIFs are exposed to interest rate risk. This is because hedge funds, LDI funds and other leveraged funds all heavily utilise interest rate derivatives, in particular interest rate swaps. The collateralised nature of repo borrowing further compounds this exposure, as increases in interest rates will reduce the value of the bonds in the repo, potentially leading to collateral calls and increased financing costs.

[61] In the case of GBP-denominated LDI funds, gross notional exposures on interest rate derivatives are larger than repo exposures. However, gross notional exposures overstate the economic exposure. When using initial margins, exposures on interest rate derivatives are a fraction of gross notional exposures. Stress test results also show that interest rate risks related to repo borrowing are larger than risks related to interest rate derivatives.

Chart 11

Leverage metrics in substantially leveraged AIFs



Source: ECB (AIFMD, EMIR, SFTR).

Notes: Panel a): the values reported are averages weighted by NAV. The dark grey line indicates the threshold of three for commitment leverage in the AIFMD definition of substantial leverage. Panel b): synthetic leverage is measured as gross synthetic exposure (EMIR) divided by NAV (AIFMD). Leverage through repos is measured as gross repo borrowing (SFTR) divided by NAV (AIFMD). The size of the circles is proportional to the aggregate NAV. Leverage through repos is set to zero for other hedge funds to comply with data confidentiality guidelines. Panel c): FX, equity and other derivatives are grouped together for relative value hedge funds and EUR-denominated LDI funds to preserve data confidentiality. Panel d): initial margins posted by the AIF are missing for about half of the derivative portfolios. Initial margins in these cases are imputed based on the assumption that the ratio of initial margins posted over synthetic exposures is constant across portfolios held by the same group of AIFs.

To estimate the impact of interest rate shocks on the mark-to-market value of AIFs' bond and interest rate swap positions, an approximation method is used.[62] The estimated values for a basis point increase are compared with the sensitivities (DV01s[63]) that AIFs must report under the AIFMD (Chart 12, panel a). For LDI funds, the results align well with the self-reported sensitivities, suggesting that the approximation is adequate. However, there is a significant negative impact on the NAV of hedge funds and other funds, even though their aggregate self-reported sensitivities are close to zero.[64]

An interest rate shock could lead to substantial losses for LDI funds, increasing solvency risk. In the case of a 100 basis point parallel upward shift in yields, the average loss for GBP-denominated LDI funds is 22% of net assets. For EUR-denominated LDI funds, the effect is somewhat smaller, resulting in a 13% loss of net assets (Chart 12, panel b). The impact on GBP-denominated LDI funds is primarily driven by revaluation of leveraged bond positions from repo borrowing, rather than by interest rate swaps.[65] Conversely, for EUR-denominated LDI funds, the effect is predominantly from interest rate swaps. The effect for GBP-denominated LDI funds ranges from -40% to -10% of NAV, while EUR-denominated LDI funds exhibit an even wider dispersion (Chart 12, panel c).

For hedge funds and other funds, losses are much smaller as their net exposure to interest rate risk is lower than that of LDI funds. A 100 basis point increase in yields reduces hedge funds' NAV by about 5%. This low impact is likely due to offsetting positions in repo and derivatives markets, particularly for relative value strategies. However, hedge funds might also be exposed to other risk factors, such as changes in the slope of the yield curve or credit risk that have not been considered in this sensitivity analysis. Indeed, self-reported sensitivities to changes in credit spreads (CS01s[66]) indicate losses of about 12% of NAV for relative value hedge funds in response to a 100 basis point increase in credit spreads. For most hedge funds and other funds, losses are below 10% (Chart 12, panel c). For other funds, the aggregate loss is 9% of NAV, primarily due to the revaluation of unpledged bonds, which directly affects the funds' NAV without offsetting collateral arrangements.

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62 Changes in the valuations of interest rate swaps and bonds used as repo collateral are estimated based on three assumptions. (1) For bonds with a fixed coupon rate, a shift of the yield to maturity is used (and not of the yield curve). (2) For floating rate notes, the effect is assumed to be zero. (3) Interest rate swaps can be viewed as a combination of a long position in a bond with a fixed coupon rate and a short position in a floating rate note. For unpledged bonds, no position-level information is available. The impact of interest rate changes on unpledged bonds is imputed based on the assumption that their relative price change is the same as for repo collateral pledged by AIFs of the same category.

63 DV01, or "dollar value of 01", is a measure used in fixed income markets to quantify the change in the price of a bond for a 1 basis point (0.01%) change in yield.

64 A possible reason for this discrepancy is that some fund managers seem to report DV01s with the wrong sign, which biases the aggregate DV01 towards zero.

65 See the special feature entitled "Stress associated with liability-driven investment strategies" in European Systemic Risk Board (2023), "EU Non-bank Financial Intermediation Risk Monitor 2023", June.

66 CS01, or "credit spread of 01", is a measure used in fixed income markets to quantify the change in the price of a bond for a 1 basis point (0.01%) change in the credit spread.

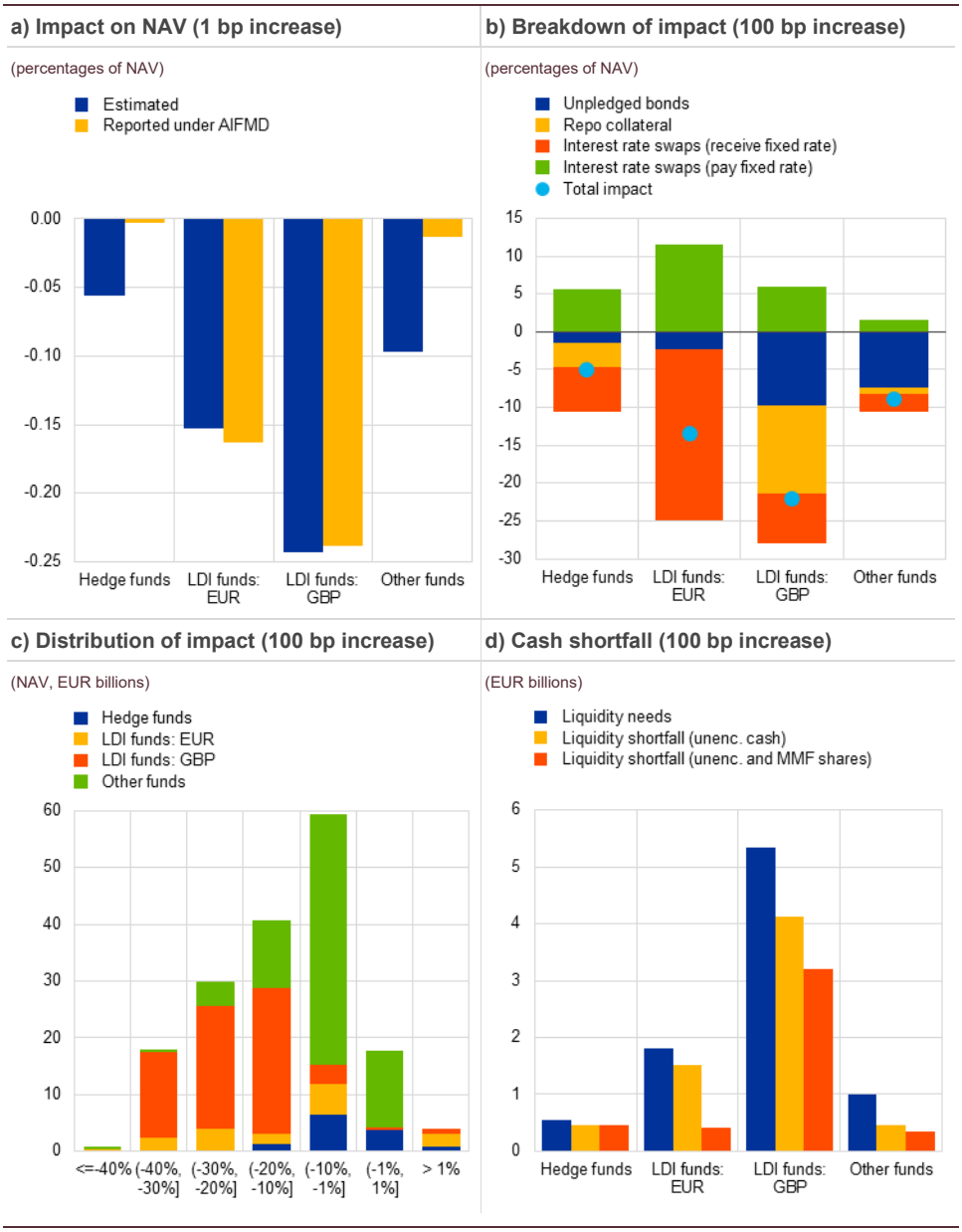
Unencumbered cash is not sufficient to cover liquidity needs in the case of a 100 basis point interest rate increase. In more than half of LDI funds, cash is not sufficient to cover margin and collateral calls in response to a 100 basis point upward shift in the yield curve.[67] The total cash shortfall is €6.5 billion and could be addressed, in the case of collateral calls, by posting unpledged bonds or, more generally, by redeeming MMF shares and selling unpledged bonds (Chart 12, panel d). Such actions could transmit stress to MMFs and/or sovereign bond markets through procyclical asset sales. However, liquidity needs from repos could also be addressed by pledging bonds instead of selling them, if the unpledged bonds are of sufficiently high quality. It is worth noting that in previous stress episodes, LDI funds typically relied on this option. This could reduce transmission of stress to sovereign bond markets. Additional calculations for a 300 basis point increase show that a vast majority of GBP-denominated LDI funds in the sample are resilient to this level of shock. A yield buffer of 300 basis points was subsequently codified in Luxembourg and Ireland under Article 25 AIFMD in response to the 2022 gilt market crisis.[68] This analysis is overly simplified for definitive conclusions but suggests yield buffers may adequately address systemic risks in those funds. Among hedge funds and other leveraged funds, either no shortfalls or only negligible shortfalls are observed.

[67] This finding is consistent with previous analysis done by the ESRB. See the special feature entitled "Stress associated with liability-driven investment strategies" in European Systemic Risk Board (2023), "EU Non-bank Financial Intermediation Risk Monitor 2023", June.

[68] For details, see the announcements from the Central Bank of Ireland and the Commission de Surveillance du Secteur Financier.

Chart 12

Sensitivity to changes in the risk-free rate



Source: ECB (AIFMD, EMIR, SFTR).
Notes: Panel a): AIFs with a missing DV01 in the AIFMD dataset are excluded. Panel b): the impact on repo collateral is set to zero for EUR-denominated LDI funds due to data confidentiality. Panel c): some bins contain less than three funds of a certain category. In these cases, this fund category is omitted to preserve data confidentiality. Panel d): to calculate liquidity needs per AIF category, changes in liquidity due to margin calls and demand for additional repo collateral are considered and add up liquidity needs among AIFs with negative changes in liquidity. To calculate the liquidity shortfall per AIF category, the changes in liquidity at the AIF level are compared with available liquidity (either unencumbered cash or unencumbered cash and MMF shares) and add up the liquidity shortfall among AIFs for which the liquidity need exceeds available liquidity. Observations are discarded if unencumbered cash is missing, zero, or larger than the NAV or long position in cash. Since only a small number of funds face a liquidity shortfall when unpledged bonds are considered, such a breakdown cannot be shown in panel d) for reasons of data confidentiality.

Leverage in AIFs significantly amplifies systemic risks, with hedge funds and LDI funds showing different vulnerabilities. Hedge funds face high exposure to price fluctuations due to extensive leverage use, while LDI funds are more sensitive to interest rate changes owing to their reliance on interest rate swaps and repo borrowing. Stress scenarios suggest that interest rate hikes could lead to substantial losses, especially for GBP-denominated LDI funds due to their significant presence

in the gilt market. The current yield buffer requirements seem to address this risk. Nonetheless, the analysis underscores the systemic risks posed by leveraged AIFs, as even minor market shocks can trigger large losses and liquidity strains, potentially leading to procyclical asset sales. The study highlights the need for strong regulatory oversight to manage these risks, advocating for the use of Article 25 AIFMD where warranted, and enhanced stress testing. Integrating AIFMD data with transaction-level insights is important for informed regulatory decisions.

2.2 Synthetic leverage by UCITS using the absolute VaR approach

The ESRB has highlighted excessive leverage in the financial system as a key vulnerability[69], drawing attention to the leverage practices of UCITS employing the absolute VaR approach. The 2024 monitor examined how the VaR approach enables UCITS to achieve leverage levels similar to those of AIFs. Reflecting this, in its response to the European Commission's consultation, the ESRB emphasised that VaR measures should serve as a complement to, rather than a substitute for, direct leverage restrictions.[70] This special feature presents new evidence, also drawing on a report by ESMA.[71] It illustrates risks associated with these leveraged strategies and underscores the need for harmonised regulatory measures to address the associated risks.

UCITS are subject to stringent constraints for on-balance-sheet leverage, but some funds using the VaR approach have increased synthetic leverage through derivative positions. Regarding financial leverage, all UCITS can borrow up to 10% of their NAV on a temporary basis. All UCITS also face constraints on their global exposures. Under the commitment approach, which is used by most funds, leverage after netting and hedging is limited to 100% of NAV. However, funds can employ the VaR approach, which imposes indirect limits on their leverage by limiting market risks. Under the relative VaR approach, the one-month VaR of the fund at the 99th confidence level must be equal to or less than 200% of the VaR of a leverage-free benchmark. Under the absolute approach, the VaR is limited to 20% of NAV.

Funds using the absolute VaR approach can increase their exposures to several multiples of their NAV. The VaR is directly related to the volatility of a portfolio. If the portfolio exhibits low volatility, the VaR will also be low. Consequently, the fund can use derivatives to replicate the initial portfolio until the VaR constraint becomes binding. For instance, if the VaR is 4%, a fund could replicate these

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69 See Box 5 in European Systemic Risk Board (2024), "EU Non-bank Financial Intermediation Risk Monitor 2024", June.

70 See Policy Digest 2 in European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

71 European Securities and Markets Authority (2025), "Risks in UCITS using the absolute Value-at-Risk approach", *TRV Risk Analysis*, April.

portfolio exposures up to five times before the 20% limit of the absolute VaR approach becomes binding.[72]

UCITS employing the absolute VaR approach constitute at least 8% of all UCITS funds in terms of net assets and pursue a variety of strategies. Based on regulatory information provided by six NCAs, a recent ESMA report showed that around 2,000 UCITS are using the absolute VaR approach.[73] These UCITS had a combined NAV of €731 billion at the end of 2023, accounting for 8% of all UCITS (Chart 13, panel a).[74] Most of these funds are fixed income and mixed funds, accounting for 52% and 26% of NAV respectively. Another category of VaR UCITS are funds which are typically labelled by the industry "alternative UCITS" – funds that pursue hedge fund-like strategies (such as long/short, global macro, etc.) while complying with the UCITS regulatory framework. These account for 14% of NAV.

Some UCITS using the absolute VaR approach have high levels of gross leverage that exceed those of AIF hedge funds. These funds constitute 2% of all UCITS in terms of net assets. Regulatory data can be used to calculate gross leverage measures, defined as the sum of long positions combined with positions that replicate short exposures through derivatives, divided by NAV.[75] Some UCITS that employ the absolute VaR approach have leverage levels higher than AIF hedge funds: alternative UCITS had an aggregated leverage of 800% of NAV at the end of 2023, compared with 600% for AIF hedge funds (Chart 13, panel b).[76] Focusing on funds with leverage exceeding 400% of NAV, this group comprises many different types of funds. Around 56% of alternative UCITS have a leverage above 400%, while the share is 15% across fixed income, mixed and other funds.

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72 See Box 5 in European Systemic Risk Board (2024), "EU Non-bank Financial Intermediation Risk Monitor 2024", June.

73 This represents a lower bound in terms of number and size of VaR UCITS since those funds are also present in other EU jurisdictions. In addition, some UCITS use the relative VaR approach and were not included in the analysis.

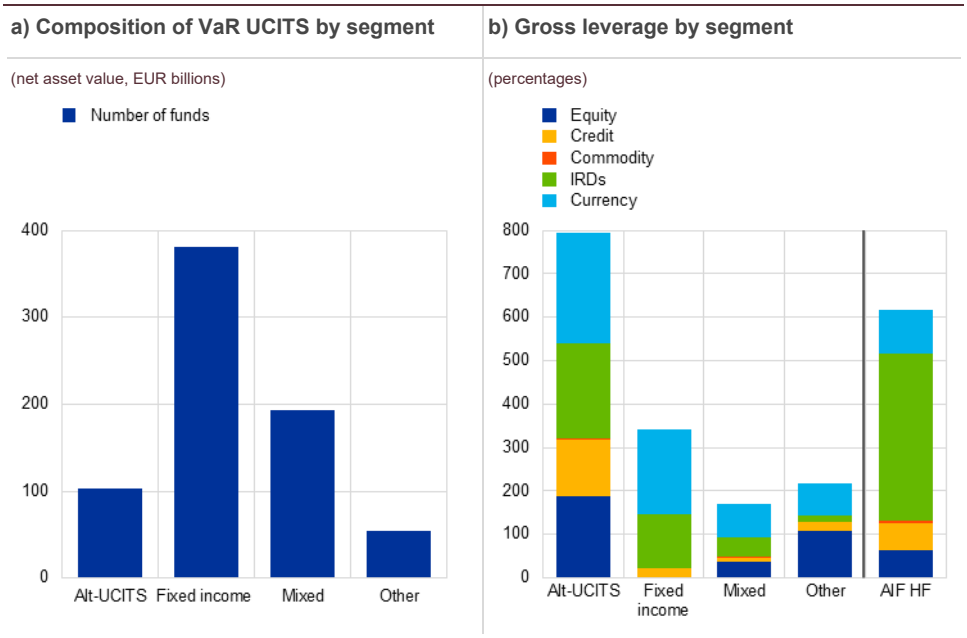
74 This estimate is a lower bound since it is based on information from six NCAs and relies on commercial data for the NAV. In 2023 absolute VaR funds in Ireland and Luxembourg had an NAV of €997 billion, around 10% of the UCITS sector.

75 Leverage reported under the commitment approach, which allows for hedging and netting of positions in certain cases, provides a clearer view of funds' directional positions. However, UCITS using the VaR approach do not have to report leverage under the commitment approach.

76 A sample of 388 hedge funds reporting under the AIFMD and using derivatives was used, with an NAV of €60 billion.

Chart 13

Strategies and use of leverage by UCITS using the absolute VaR approach

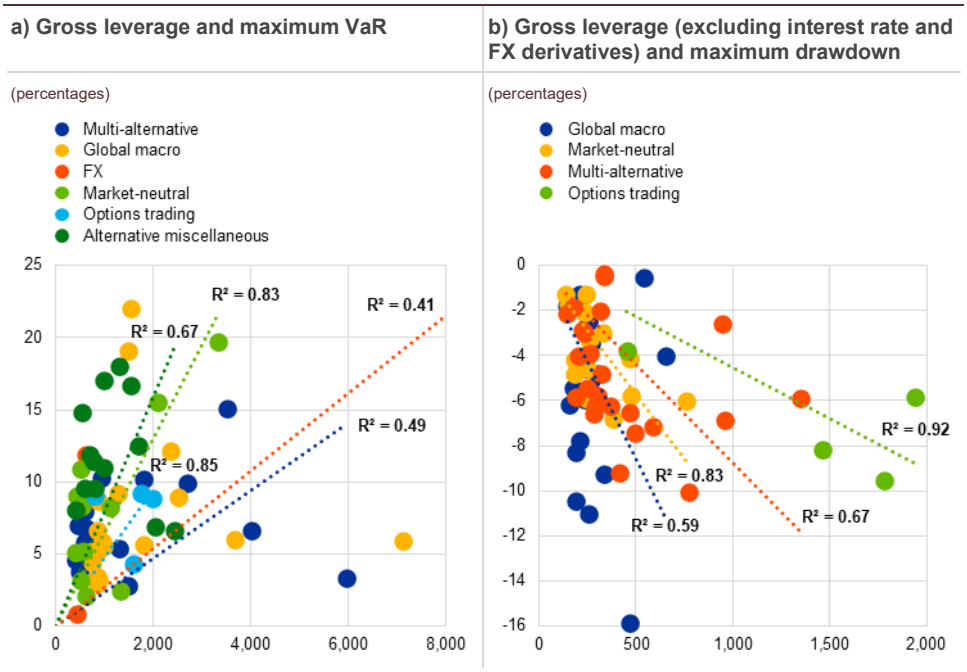


Sources: ECB (AIFMD, EMIR), Morningstar Direct and ESMA.
Notes: Alt-UCITS stands for alternative UCITS and denotes UCITS using the absolute VaR approach. AIF HF stands for hedge funds operating under the AIFMD. Panel b): gross notional exposures of alternative UCITS using the absolute VaR approach and AIF HFs, as a share of NAV.

High gross leverage is correlated with market risk, indicating the use of directional positions by funds. Unlike the commitment approach, gross leverage does not account for netting and hedging arrangements and thus may overstate net exposures. This is particularly true if the funds are using foreign exchange (FX) and interest rate derivatives for hedging, as gross notional amounts can exaggerate economic exposures. Using data from a subset of 150 VaR UCITS with the highest gross leverage, all belonging to the "alternative UCITS" category, Chart 14, panel a), demonstrates that high gross leverage is associated with high market risk, as measured by the maximum VaR reported by funds in their annual reports. This suggests the use of derivatives for directional positions rather than hedging. Similarly, Chart 14, panel b). shows a negative relationship between the maximum drawdown – defined as the peak-to-trough performance of a fund on a 12-month rolling basis – and gross leverage, after excluding FX and interest rate derivatives that might be used for hedging. This indicates that among funds with leverage exceeding 400% of NAV, those with the largest drops were also those with the highest gross leverage. Overall, this analysis points to the directional positions taken by highly leveraged UCITS that employ the absolute VaR approach.

Chart 14

Market risk measures and gross leverage

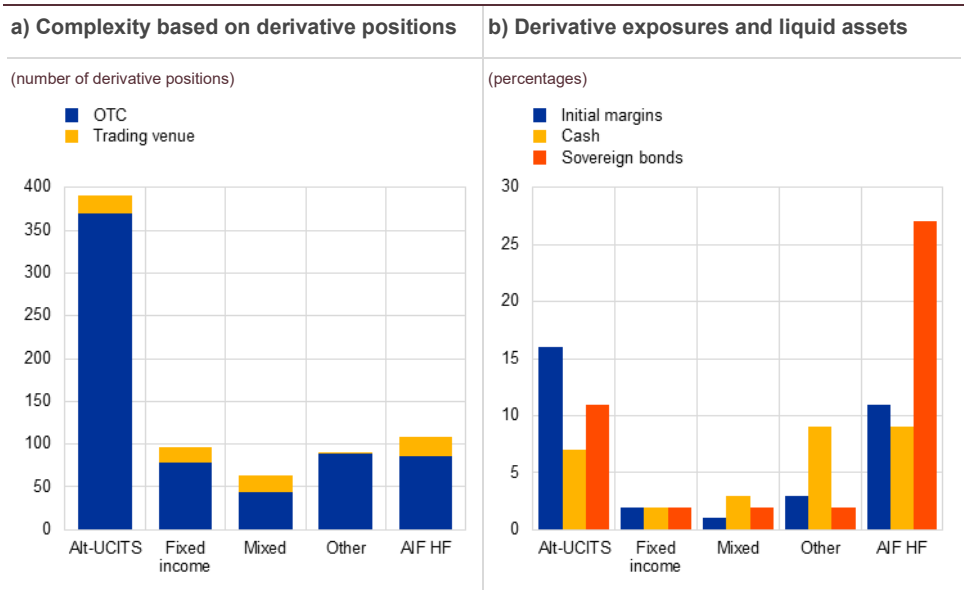


Sources: Annual reports, ECB (EMIR), Morningstar Direct, ESRB (SFTR) and ESMA.
Notes: Panel a): maximum VaR (as a share of NAV) on y-axis and gross leverage (as a share of NAV) on x-axis of VaR UCITS funds with gross leverage above 400% of NAV. Panel b): 12-month maximum drawdown on y-axis and adjusted leverage (gross leverage excluding interest rate and FX derivatives) on x-axis of VaR UCITS funds with gross leverage above 400% of NAV, excluding alternative miscellaneous funds, as a share of NAV. The sample consists of 150 VaR UCITS with the highest gross leverage levels, all of them belonging to the category of "alternative UCITS". R-squared is the proportion of the variance in the dependent variable (y-axis) that is explained by the independent variable (x-axis) in a simple linear regression model.

Some UCITS using the absolute VaR approach, particularly those pursuing alternative strategies, are exposed to liquidity imbalances. These UCITS make extensive use of derivatives. In particular, alternative UCITS hold an average of 400 derivative positions, primarily over-the-counter (OTC) derivatives. This is more than twice the average for AIF hedge funds (Chart 15), highlighting the complexity of the strategies employed by some UCITS using the absolute VaR approach. Moreover, alternative UCITS hold a lower proportion of highly liquid assets, such as cash and sovereign bonds, compared with AIF hedge funds. Despite this, these UCITS exhibit higher relative derivative exposures. This is measured by the ratio of initial margins to NAV. These metrics suggest risks related to liquidity imbalances. Adverse price movements could lead to substantial margin calls on UCITS using the absolute VaR approach. Meeting these calls might be challenging if sufficient highly liquid assets are not available.

Chart 15

Complexity and holdings of highly liquid assets by VaR UCITS and hedge funds



Sources: ECB (AIFMD, EMIR), Morningstar Direct and ESMA.
Notes: Alt-UCITS stands for alternative UCITS and denotes UCITS using the absolute VaR approach. AIF HF stands for hedge funds operating under the AIFMD. Panel a): average number of open derivative positions by fund type and execution venue. Panel b): initial margins, cash and sovereign bond exposures by fund type as a share of NAV.

There are pockets of vulnerabilities within UCITS using the absolute VaR approach that need to be addressed. The analysis has shown that a subset of UCITS that use the absolute VaR approach, particularly alternative UCITS but also other fund types, has high leverage and pursues complex strategies. These highly leveraged funds represent a small fraction of the UCITS sector but are meaningful in absolute terms (€152 billion or 2% of NAV of all UCITS). Additionally, their combined NAV exceeds the €124 billion NAV of hedge funds registered under the AIF framework. Risks to financial stability could arise from their exposure to both market (through substantial leverage and complex derivative exposures) and liquidity (through a lower proportion of highly liquid assets) risk. Strains on these funds could also damage the high reputation of the UCITS brand. This would be detrimental to the objectives of the savings and investments union to channel household savings into more productive investments. In order to mitigate risks associated with excessive leverage, the ESRB has called on the European Commission to revisit metrics and limits prescribed in the UCITS Directive and the AIFMD.[77]

[77] See the list of near-term actions the ESRB set out in its response to the European Commission's targeted consultation assessing the adequacy of macroprudential policy for non-bank financial intermediation; European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

2.3 Carry trade activity by hedge funds and financial stability risk

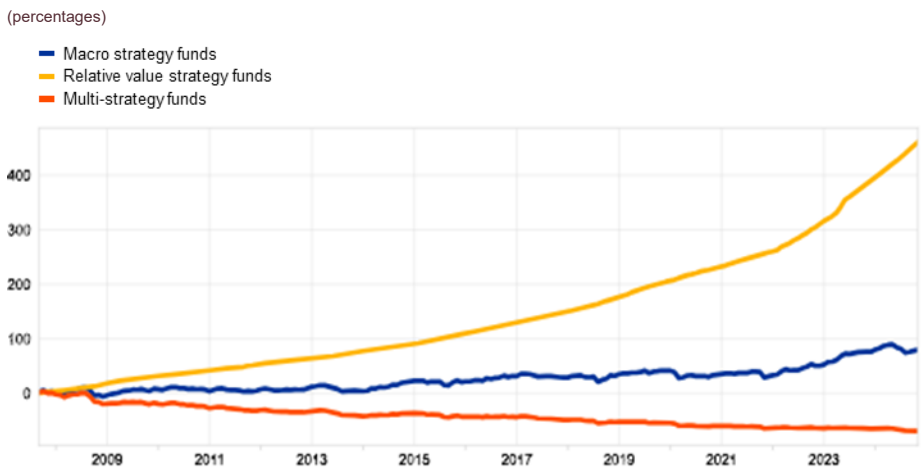
Hedge fund leverage threatens stability through liquidation and counterparty effects. Hedge funds employ business models that can accommodate substantial levels of leverage (Chart 2, panel a, and Chart A14). This leverage, in turn, can jeopardise financial stability, primarily through one of two propagation channels: the position liquidation channel and the counterparty channel. Direct contagion (the counterparty channel) refers to the contagion arising from the default or distress of leveraged funds, whereas indirect contagion (the position liquidation channel) reflects fire sales induced by collateral or margin calls. The former channel was highlighted by the carry trade event of August 2024, which pertained mostly to US hedge funds but illustrates vulnerabilities that may be present in hedge funds resident in the EU.

Before the market turmoil in August 2024, hedge funds had been engaging in carry trades. In the period leading up to this turmoil, investors had been borrowing in low-yielding currencies, particularly the Japanese yen, and investing the borrowed funds in higher-yielding currencies, primarily the US dollar, to profit from interest rate differentials. In theory, such a strategy should yield zero returns due to uncovered interest parity – in efficient markets, the interest rate differential is offset by appreciation of the funding currency. In practice, however, uncovered interest parity does not appear to hold,[78] as shown by Chart 16 where the carry trade strategy indeed yields positive returns.

[78] As shown for time frames longer than a few hours in Chaboud, A. and Wright, J. (2005), "Uncovered interest parity: it works, but not for long", *Journal of International Economics*, Vol. 66, Issue 2, pp. 349-362.

Chart 16

Carry trade cumulative returns and the forward premium puzzle



Source: Bloomberg Finance L.P.
Notes: The chart shows the breakdown of the return from a top-bottom-five carry trade strategy. Each month, long forward contracts are entered for the five currencies with the highest interest rate (carry) over implied volatility (carry-to-risk) and short positions are entered for the five currencies with the lowest carry-to-risk. The portfolio is leveraged 2x. The yellow line represents the return from earning the interest rate differentials between the high-yielding and low-yielding currencies. The red line represents the return from being exposed to market movements in the spot prices. The blue line represents the total return from the strategy. Under uncovered interest parity, the positive return from the carry (yellow line) should be offset by a negative return from the spot currency movements (red line). This is not the case, as indicated by the positive total return (blue line). Due to percentage representation, the two components do not simply add up to the blue line. The chart covers the period from September 2007 to December 2024.

During the summer of 2024 shifting monetary policy expectations triggered the unwinding of carry trades. Over this period, a change in monetary policy stance by the Bank of Japan, coupled with US labour market data that were weaker than market expectations, led to an appreciation of the yen relative to the US dollar. This resulted in margin calls, the unwinding of carry trades and deleveraging.[79] Additionally, market liquidity tends to be thin in August, which is typically attributed to decision-makers in financial institutions being on leave. Combined with crowded positions in carry trades, this may have created a situation for hedge funds where they needed to liquidate in relatively illiquid markets and amplified the indirect contagion. Although the subsequent market corrections were short-lived, the event highlighted how hedge funds in general, and carry trades in particular, can have adverse implications for financial stability, with significant cross-asset spillovers. For instance, on 24 July, the valuations of AI and tech stocks, which had shown strong price momentum in the preceding months, declined by approximately USD 1 trillion.[80] It is worth noting that carry trade strategies are mostly used outside of the EU, but monitoring of hedge funds in the EU may benefit from similar treatment as in this analysis.

From a macroprudential oversight perspective, hedge fund vulnerabilities can be difficult to detect. Analysing hedge fund risks presents several challenges. First, hedge funds have a large cross-border footprint, which may limit transparency. For example, the hedge fund sector in the EU is small, constituting 2% of total

[79] See Bank for International Settlements (2024), "The market turbulence and carry trade unwind of August 2024", *BIS Bulletin*, No 90, August.

[80] ibid.

investment fund exposure, compared with 16% globally.[81] Second, hedge funds frequently employ complex investment strategies involving both on- and off-balance sheet items. For any given investment strategy, a build-up of risks can be difficult to identify, as there are numerous ways to execute a trade. This is particularly true for carry trades. Borrowing in one currency and investing in another can, for instance, be achieved synthetically by entering into forward or option contracts in the direction of interest rate differentials. This means that position-based monitoring is imperfect and must be complemented by other metrics.

Position-based analysis can be complemented by return-based style analysis. As an alternative to position-based analysis, policymakers can benefit from inferring hedge fund positioning based on realised returns. This type of analysis, known as return-based style analysis, provides a method of quantifying risks faced by hedge funds by regressing their returns on different style factors.[82] The approach allows for the indirect measurement of, among other trades, carry trade or carry trade-like activities and has recently been applied by the Bank for International Settlements (BIS), whose work is partially replicated in Chart 17.[83]

Results from return-based style analysis suggests there was a build-up of carry trades ahead of the August 2024 market event. Chart 17 presents a rolling average of the sensitivity of the returns of various hedge fund strategies against a proxy for carry trade returns, based on a regression analysis controlling for market returns. The resulting coefficient, plotted over time, indicates the elasticity of hedge fund returns to carry trade returns, thereby serving as a proxy for carry trade activity.[84] For example, a beta of 0.5 for global macro hedge funds suggests that if carry trades yield a 1% return, all else being equal, global macro hedge funds will generate a 0.5% return for investors by being exposed to carry trade-like risks. Interpreting Chart 17, a pattern resembling a build-up of carry trades can be observed. As interest rate differentials began to widen in 2022, global macro funds – the type of hedge funds typically engaging in carry trades – became increasingly sensitive to carry trade returns.

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81 See Financial Stability Board (2024), "Global Monitoring Report on Non-Bank Financial Intermediation", December.

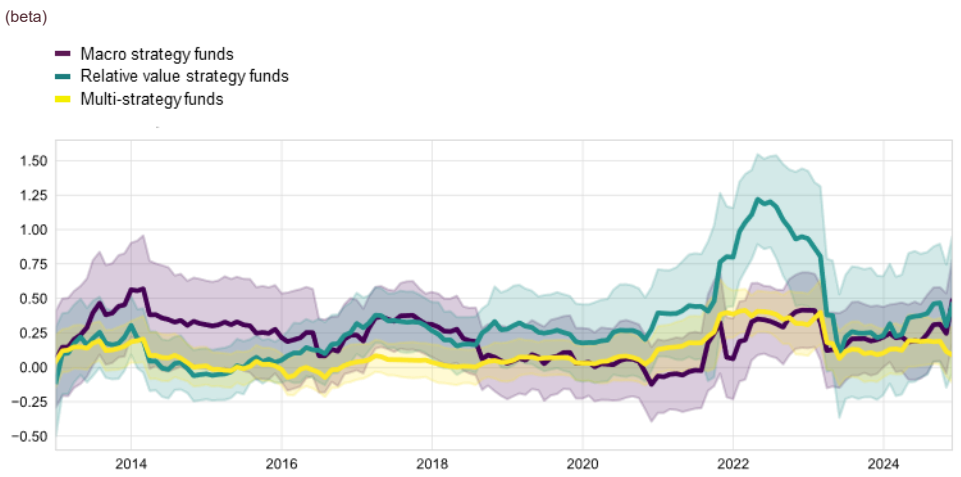
82 Style factors refer to characteristics or attributes that explain risk and return for asset classes or investment strategies.

83 Bank for International Settlements (2024), "Hedge fund exposure to the carry trade", *BIS Quarterly Review*, September.

84 It is possible to better isolate the effects of a particular strategy, here the carry trade, by controlling for other factors relevant to hedge funds' business models. However, the reduction of bias comes at a cost of more uncertain estimates, as many of the style factors are highly correlated. Additionally, this model is sensitive to outliers, making a careful interpretation of the results necessary.

Chart 17

Sensitivity to carry trade returns for selected hedge fund strategies



Source: Bloomberg Finance L.P.
Notes: The chart shows the coefficients from a rolling 36-month regression where Credit Suisse hedge fund strategy indices have been regressed on the carry trade return series computed using the strategy described in Chart 16. The regression controls for the return of the S&P 500. Error bands represent 90% confidence intervals. Beta measures the elasticity of returns for the selected hedge fund strategies against the top-bottom-five carry trade strategies. The chart covers the period from March 2013 to December 2024.

Additional metrics are needed to properly gauge carry trade activity. While return-based style analysis provides an indirect measure of carry trade crowdedness, the evidence is only suggestive. For instance, the metric tells a story of correlation rather than causation and is sensitive to model specification and outliers. Consequently, a monitoring framework for carry trades must consider a range of metrics to assess crowdedness. Table 4 outlines various market-based metrics that may provide informational value regarding carry trade positioning. The metrics are based on a monthly rebalanced portfolio of forward contracts that replicates a commonly employed carry strategy. The metrics can conceptually be split into ex ante measures of carry trade crowdedness (incentives to engage in carry trades), ex post measures of crowdedness (carry trade activity inferred from market movements) and measures of the risk of a market correction (unwind risk).

Table 4

Sample of relevant metrics for a carry trade monitoring framework

Metric		Explanation and motivation
Ex ante measures	Interest rate differential	The interest rate differential implied by one-month forwards. It represents the expected return if uncovered interest parity fails and the spot remains constant. Large interest rate differentials indicate high incentives to conduct carry trades.
	Carry-to-risk	The interest rate differential scaled by the expected volatility implied by option markets. Carry-to-risk provides a risk-adjusted measure of the carry similar to the Sharpe ratio.
	Trailing 12 months return	The return of the carry strategy over the last 12 months. Interpretation: strong performance attracts additional trades.
Ex post measures	Hedge fund beta	The elasticity of return (beta) between global macro hedge funds and the long-short carry strategy. High sensitivity indicates trade crowdedness.
	Realised volatility skew	The difference between the three-year realised volatility of positive and negative returns, scaled by the average volatility. Interpretation: asymmetric volatility indicates unwinding of crowded trades (amplification).
Unwind risk	Risk reversal	The difference in implied volatility between out-of-the-money calls and out-of-the-money puts. Risk reversal gauges market participants' asymmetric expectations of tail risk. Interpretation: large, positive risk reversals for funding currencies indicate risk appreciation and unwind.

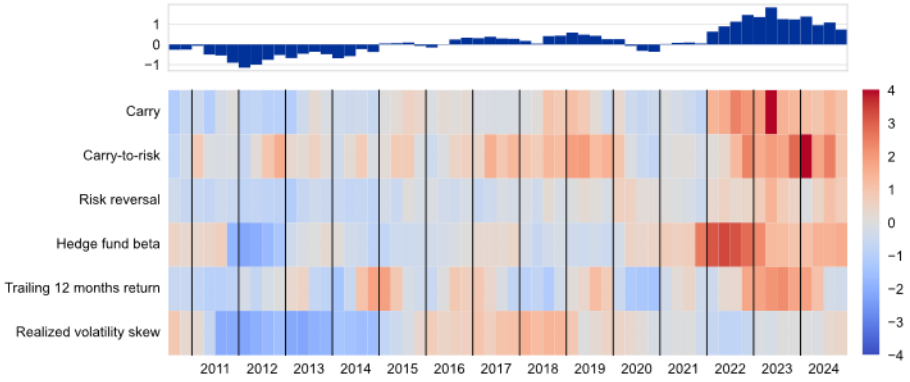
Source: ESRB.

Casting the metrics into a monitoring framework, the results align with the recent carry trade narrative. The heatmap in Chart 18 demonstrates this alignment, with the proposed metrics rescaled into z-scores. Red colours denote periods with elevated carry trade risk and appear concentrated around 2022-24, corresponding to the assumed build-up of carry trade activity. This is further corroborated by the bar chart, which shows an aggregate carry trade measure based on the individual metrics. This carry trade aggregate reached its peak in 2023.

Chart 18

Carry trade monitoring framework

(z-scores)



Sources: Bloomberg Finance L.P. and ESRB calculations.
Notes: The z-scores are computed based on an expanding window. The aggregate carry trade indicator shown in the bar chart is computed as an equal-weighted average of the individual metrics included in the heatmap.

The ESRB is using this framework in its risk identification to signal when further analysis might be warranted. While the framework is not a substitute for position-based analysis, it provides important insights into investment strategy

crowdedness and can be used by macroprudential authorities as a tool to evaluate and test their assumptions on the risks facing hedge funds. Future work could explore whether, based on existing data, a similar methodology could be used to address exposures of specific groups of funds in the EU to various investment strategies of interest.

2.4 Real estate funds and banks in the EU

This special feature focuses on banks' direct credit exposure to REIFs in the EU.[85] Funds can utilise leverage provided by banks to enhance returns for investors by increasing exposures or to mitigate risk from liquidity mismatches between their assets and liabilities by increasing cash holdings. However, analysing these exposures is hindered by regulatory information on borrowing by real estate funds being fragmented. Complementing AIFMD data with AnaCredit data – which requires banks to report on each loan they extend[86] – helps illuminate the financial stability implications of REIFs. This analysis examines the amount and type of loan financing used by REIFs, the collateral they provide to lenders, lender and borrower concentrations as well as ownership ties in the lending relationships.

Real estate funds fulfil an important economic function. Through the pooling of investor cash, real estate funds provide exposure to an asset class which, for most investors, is not readily available via direct investments. Furthermore, real estate funds provide an alternative source of funding for real estate projects. Ultimately, this contributes to enhanced risk sharing across investors and improved financing conditions for the real estate sector. REIFs are almost exclusively regulated under the AIFMD, as UCITS (largely designed for retail investors) are not permitted to directly invest in real estate assets. At more than €1 trillion in NAV, REIFs account for around 13% of total AIF net assets. This makes REIFs the second largest AIF type in the EU.

REIFs are subject to structural vulnerabilities including liquidity mismatch, leverage and interconnectedness. First, liquidity mismatches in REIFs stem from real estate assets being inherently illiquid. Despite this, EU REIFs are predominantly structured as open-ended AIFs (57% of total NAV[87]), making them vulnerable to liquidity risk. At one end of the spectrum, some of these open-ended REIFs have features (permanent gates at low levels, low redemption frequencies or redemptions that are allowed only when new investors enter the fund) that mean their liquidity mismatches are similar to close-ended funds. At the other end of the spectrum, some open-ended REIFS offer daily redemptions. This mismatch between the liquidity of assets and liabilities of REIFs is magnified by the low level of cash and cash equivalents (Chart A13, panel a) and is conducive to a first-mover advantage

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85 In this special feature, the term "banks" refers to credit institutions in accordance with Article 4(1) No 1 of the Capital Requirements Regulation.

86 Data include credits extended to non-natural persons whose total commitment amount for all relevant instruments equals or exceeds €25,000 as at the reporting reference date.

87 See European Securities and Markets Authority (2024), "EU Alternative Investment Funds 2023", *ESMA Market Reports*, January.

and associated fire sale externalities.[88] Second, REIFs frequently use leverage to acquire the underlying assets, as evident in Chart A14, panel a).[89] Real estate funds exhibit the second highest level of financial leverage across AIF types, after hedge funds, with borrowings accounting for around 14% of total liabilities. Leverage might amplify downturns, as falls in real estate prices could force funds to liquidate assets to meet covenants, margin calls or loan repayments. This risk might be accentuated by the large market footprint of REIFs in certain jurisdictions.[90] High leverage also exacerbates liquidity mismatches, as redemptions must be met with greater asset sales. Third, REIFs are interconnected with various players in the financial system, including their various investors and banks. In particular, the leverage provided to real estate funds adds to the complexity and interconnectedness of the financial system – directly through contractual relationships with banks and other non-banks, and indirectly including though ownership ties. Due to interconnectedness, solvency and liquidity, problems for real estate funds can transmit across the financial system. For instance, banks provide financing to real estate funds. If the borrowing fund is excessively leveraged, adverse price developments might reduce the ability of the fund to repay the loan and expose banks to credit losses.[91]

Real estate funds mainly obtain financing through credit lines and loans. Based on data from AnaCredit, real estate funds are the most leveraged fund type, with financial leverage amounting to around 7% of net assets at the fund level (Chart 19, panel a).[92] The borrowing instruments utilised by these funds are primarily loans and credit lines (Chart 19, panel b). For contrast, hedge funds extensively tap repo funding and private equity funds frequently use revolving credit facilities.

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88 For work highlighting the REIF liquidity mismatch and the potential remedies, see European Systemic Risk Board (2024), "ESRB response to the ESMA consultation on draft Regulatory Technical Standards and Guidelines on liquidity management tools", July.

89 For practical examples of addressing leverage-related risks in real estate funds, see the Central Bank of Ireland's imposition of leverage limits under Article 25 AIFMD.

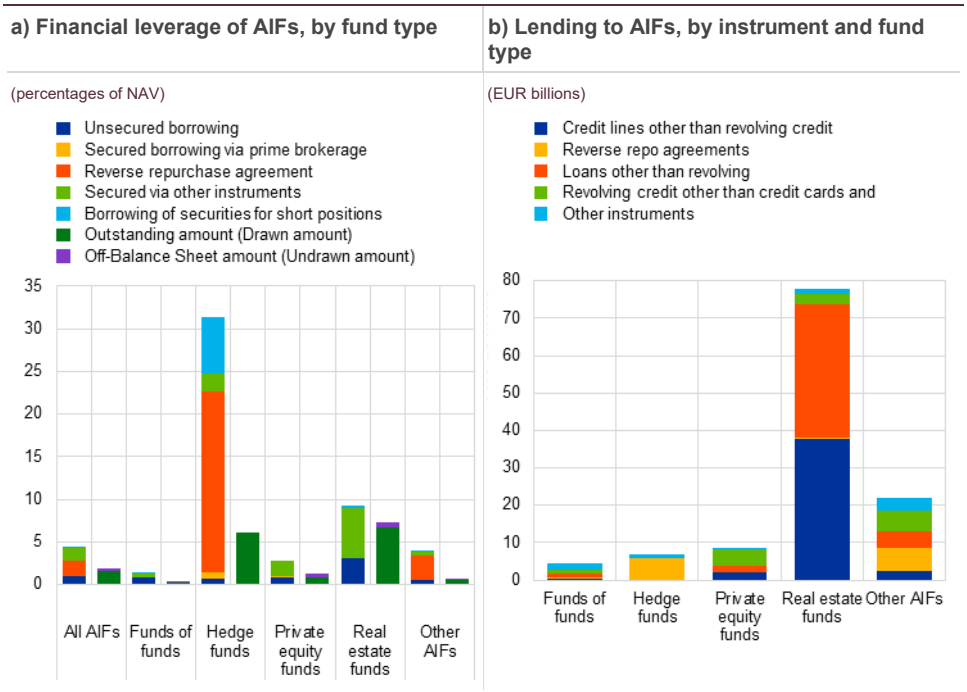
90 See European Securities and Markets Authority (2024), "Assessing risks posed by leveraged AIFs in the EU", *TRV Risk Analysis*, January.

91 See European Systemic Risk Board (2023), "Issues note on policy options to address risks in corporate debt and real estate investment funds from a financial stability perspective", September.

92 The difference from 14% referenced above is largely due to the different scope of each dataset.

Chart 19

Financial leverage and borrowing instruments of AIFs



Sources: ECB (AIFMD, AnaCredit) and ESRB calculations.
Notes: Financial leverage is defined as the sum of total borrowings for each fund type divided by net asset value. Unsecured borrowing, secured borrowing via prime brokerage, reverse repurchase agreements, secured borrowing via other instruments and borrowing of securities for short positions amounts come from the AIFMD dataset. Outstanding and off-balance-sheet borrowing amounts come from AnaCredit. The sample of AIFs includes all the funds in the AIFMD dataset that report positive borrowings. The sample from AnaCredit includes all funds from the AIFMD dataset whose LEI is matched in AnaCredit, as borrower. The financial leverage percentage in AnaCredit would reach 20% if only the net asset value of funds matched in AnaCredit is used as a denominator. Borrowings of securities for short positions of private equity funds are not shown because of confidentiality reasons. Off-balance-sheet borrowings of hedge funds are not shown because of confidentiality reasons. Credit lines and loans of private equity funds are not shown because of confidentiality reasons. The outstanding nominal amount is the amount drawn under the instrument; the off-balance-sheet amount measures the remaining amount that is contractually agreed and that can be drawn so that the credit limit is not exceeded. Data as at year-end 2022.

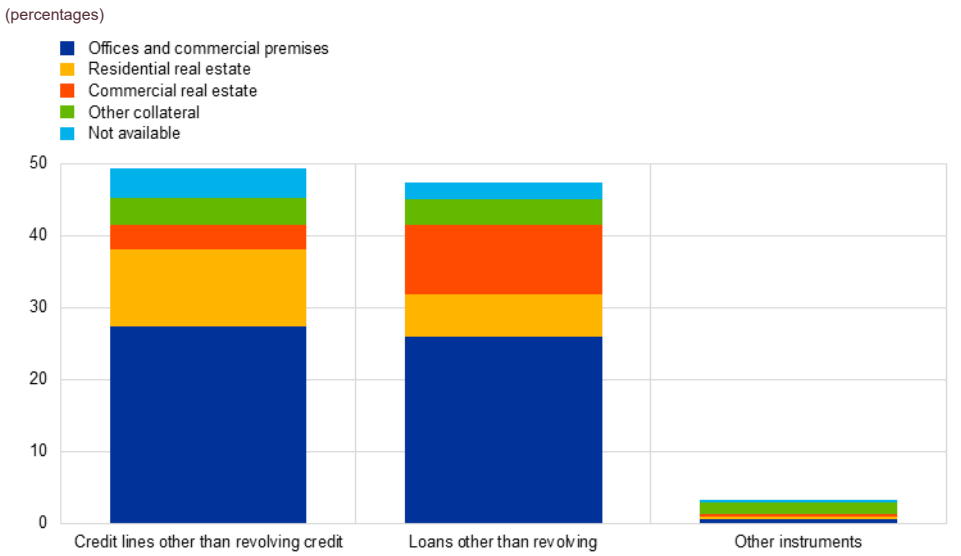
The frequent drawing on credit lines might be reflective of the risk management practices employed by open-ended real estate funds. The redemption frequency offered by funds appears to positively covary with the amount of borrowing drawn by the funds; the largest borrowers usually offer daily redemptions.[93] By contrast, funds that draw less on their credit lines typically only permit monthly redemptions. These findings indicate that real estate funds might use credit as a tool to manage liquidity. A more detailed examination of redemption frequencies and related conditions would be needed to confirm this.

Loans provided to real estate funds are primarily collateralised by commercial properties. The collateral provided by real estate funds highlights the exposure of banks to fluctuations in the real estate market. Over 80% of the borrowings by REIFs are secured by real estate assets, with a large portion backed by CRE (Chart 20). This practice can create procyclical effects: in the event of a downturn in real estate prices, open-ended REIFs might face liquidity pressures due to redemptions and losses at the same time as the value of their collateral declines.

[93] Real estate AIFs borrowing more than €200 million are considered large borrowers.

Chart 20

Collateral posted by real estate AIFs



Source: ECB (AIFMD, AnaCredit).
Notes: The chart illustrates the percentage values of collateral utilised by real estate AIFs. In AnaCredit, each instrument and contract ID is assigned the collateral type with the highest allocated value. If the allocated value of the collateral is zero, the collateral type is deemed unavailable. Collateralised borrowing accounts for 80% of the total borrowing by real estate funds. The definitions of categories are included in the AnaCredit documentation. Data as at year-end 2022.

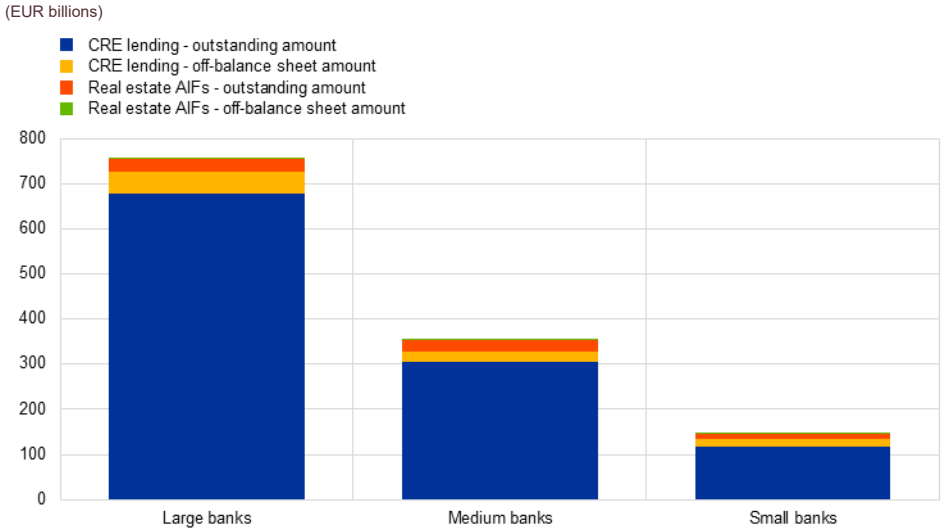
REIF borrowing from banks appears to be concentrated, with a few funds representing a large share of REIF borrowing. According to data from AnaCredit, indebtedness is concentrated in a relatively small number of real estate funds. The top 1% of REIFs represent more than 40% of total bank lending to REIFs. This underscores idiosyncratic risks in banks' real estate lending.

Similar to borrowers, lenders also tend to be concentrated. The 15 largest lenders to real estate AIFs (out of more than 500 covered by the dataset) represent 25% of the total loan stock to real estate AIFs. In relation to banks' total CRE exposures, lending to real estate funds represents a lower share in the EU compared with the United States, where 30% of CRE exposure for large banks is to REIFs.[94] Nonetheless, the share of lending to REIFs is not negligible for EU banks and ranges from 5% to 10% of total exposures to CRE, depending on the size of the bank (Chart 21).

[94] See Acharya, V.V., Gopal, M., Jager, M. and Steffen, S. (2024), "Shadow Always Touches the Feet: Implications of Bank Credit Lines to Non-Bank Financial Intermediaries", May.

Chart 21

EU banks' exposure to commercial real estate



Sources: ECB (AIFMD, AnaCredit), Bureau van Dijk and ESRB calculations.
Notes: Large banks have total assets above €100 billion, medium banks have total assets between €10 billion and €100 billion, and small banks have total assets below €10 billion. Data as at year-end 2022.

Ownership ties represent another source of interconnectedness, potentially leading to external support or step-in risk.[95] 10% of total lending to real estate AIFs is provided by banks affiliated with the AIFM. Even in the absence of contractual obligations, these banks might directly support a distressed fund by extending loans or purchasing fund shares. Such affiliations could intensify the negative spillover effects of tensions in the CRE sector on banks, including reputational spillovers.

The special feature explores the direct credit exposure of EU banks to REIFs, highlighting the financial stability implications. REIFs utilise bank leverage to enhance returns and manage liquidity mismatches between assets and liabilities. While these funds play a vital economic role by offering investors access to real estate and providing alternative funding for projects, they face structural vulnerabilities such as liquidity mismatch, leverage and interconnectedness. Loans to REIFs are mainly secured by commercial properties, posing a procyclical risk during real estate downturns. The borrowing and lending landscape is concentrated, with a small percentage of REIFs and banks dominating the market, which underscores idiosyncratic risks. However, whereas in the United States 30% of CRE exposure for large banks is to REIFs, this share is lower in the EU – between 5% and 10% of total exposures to CRE, depending on the size of the bank.[96] Additionally, ownership ties between banks and REIFs may lead to step-in risks, intensifying potential negative spillover effects.

[95] See the special feature entitled "Asset manager ownership structure in the EU" in European Systemic Risk Board (2024), "EU Non-bank Financial Intermediation Risk Monitor 2024", June.

[96] See Acharya, V.V. et al., op. cit.

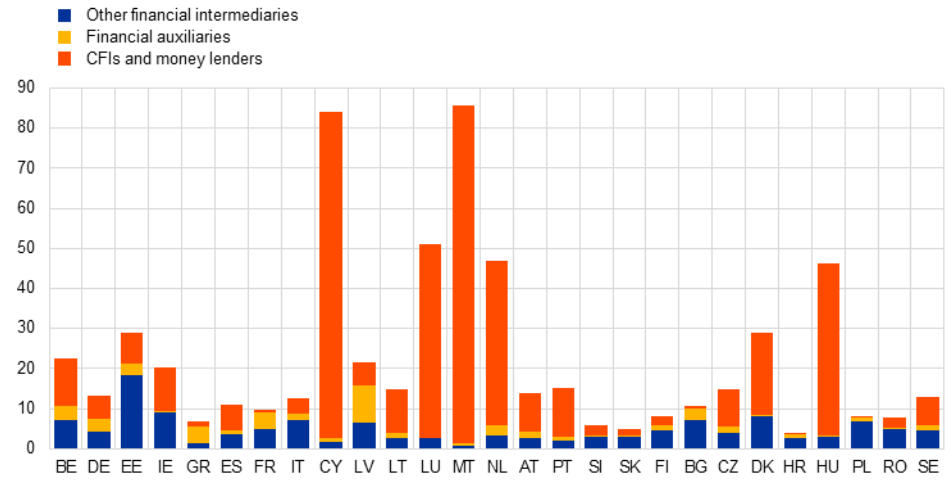
2.5 CFIs: links in the intermediation chains

CFIs[97] accounted for around 40% of OFIs' aggregate balance sheet in 2023. They are the largest group of OFIs – financial entities that do not fall under the categories of MFIs (banks and MMFs), investment funds, insurance corporations or pension funds.[98] Their share of OFIs is largest in Cyprus[99], Luxembourg, Malta, the Netherlands and Hungary (Chart 22). Transnational corporations often use CFIs to manage their business activities and organise their corporate investments globally. Within the ownership structures of these corporations, CFIs are typically placed between the ultimate parent and the operating affiliates. They serve various investment and financing functions, such as managing liquidity and optimising financing.[100,101] This can include pooling cash from operational affiliates, providing intragroup loans, raising funds to lend on behalf of the parent company and centrally managing treasury activities and accounts receivable.

Chart 22

Breakdown of OFI liabilities as a share of financial sector liabilities

(Q3 2024, percentages)



Source: ECB (QSA).

Understanding the risks associated with CFIs is difficult due to the limitations on available data. Although data for CFIs have recently become available, the lack of standardised and harmonised data collection across EU countries makes it

97 Statistical sector S.127.

98 The European System of Accounts 2010 (ESA 2010) identifies three OFI subsectors based on their primary financial activities: other financial intermediaries, excluding insurance corporations and pension funds (sector S.125); financial auxiliaries (sector S.126); and captive financial institutions and money lenders (sector S.127). For more information, see European Central Bank (2024), "Financial accounts for other financial institutions by subsectors and counterpart sectors".

99 The captive financial institutions and money lenders sector in Cyprus is dominated by financial SPEs, which have limited activity relevant to the domestic economy.

100 See International Monetary Fund (2018), "Final Report of the Task Force on Special Purpose Entities", IMF Statistics Department, Thirty-First Meeting of the IMF Committee on Balance of Payments Statistics, Washington, D.C., 24-26 October.

101 See Di Filippo, G. and Pierret, F. (2020), "A Typology of Captive Financial Institutions and Money Lenders (sector S127) in Luxembourg", Working Papers, No 146, Banque centrale du Luxembourg, July.

challenging to understand the network of CFIs, their connections to the financial system and any risks and vulnerabilities involved. Despite these challenges, national efforts have been made to better understand the connections between CFIs and other financial entities. Di Filippo (2024) is one of the first efforts to understand risks associated with CFIs and analyse the origin and destination of pass-through foreign direct investment (FDI) in Luxembourg that flows through CFIs.[102] The paper focuses on CFIs linked to both resident and non-resident investment funds that target private equity or real estate and is the basis for this special feature.[103]

In Luxembourg, private equity funds and REIFs use CFIs to structure their investments.[104] These investment funds obtain financing from their limited partners (investors), as well as through leverage (notably from banks and private debt funds).[105] This financing supports their respective portfolios, which consist of non-listed companies for private equity funds or properties for real estate funds. To organise investors and leverage providers in a hierarchy, the funds can establish new companies, known as "NewCos", which are classified as CFIs. In this hierarchy, entities financing CFIs placed closer to the actual investment have higher priority in the event of insolvency proceedings. In Figure 3, for example, the "MidCo" is situated further from the investment relative to the "BidCo". Due to this, senior creditors, such as banks, providing loans to the BidCo would have the right to make a prior claim on the underlying assets, compared with junior or mezzanine investors, such as those purchasing debt securities issued at the MidCo level.

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[102] See Di Filippo, G. (2024), "Direct Investment Positions held by Captive Financial Institutions in Luxembourg affiliated to Investment Funds focusing on Private Equity or Real Estate", *Working Papers*, No 181, Banque centrale du Luxembourg, January.

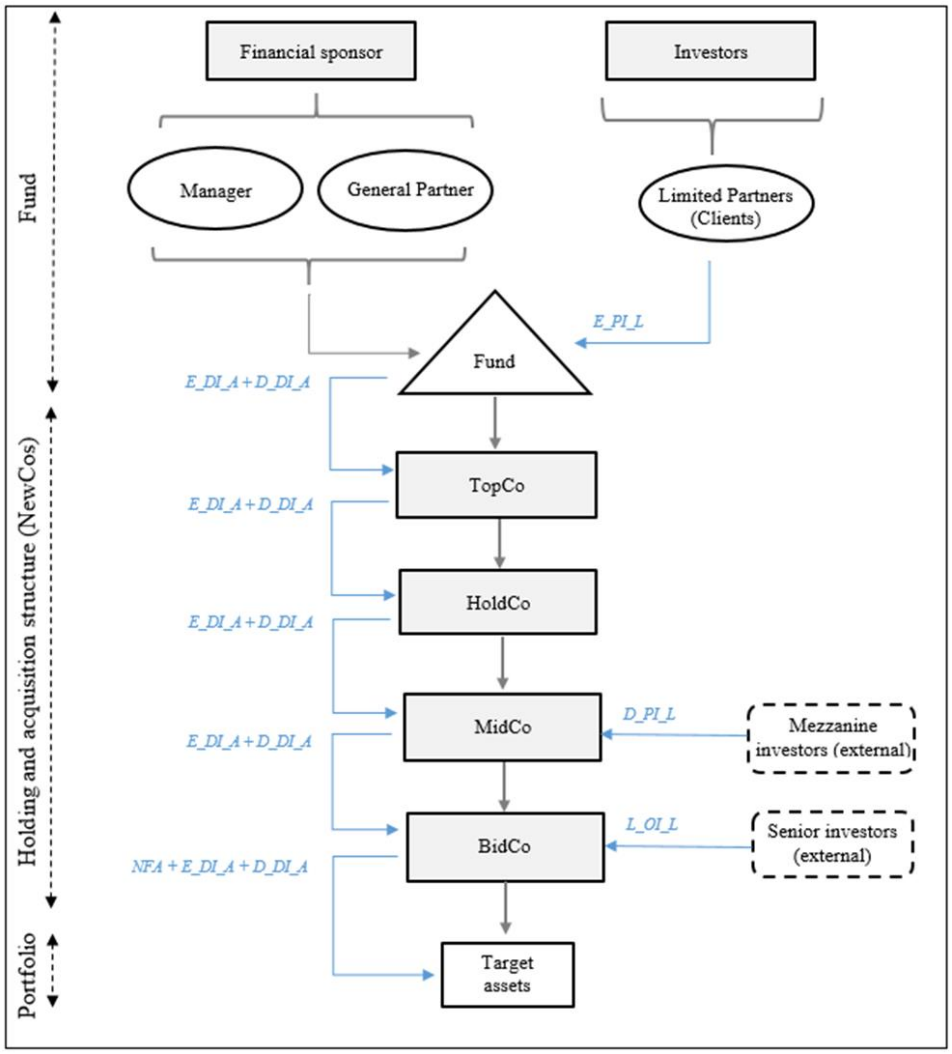
[103] In Luxembourg, groups involved in "finance and insurance" activities hold the largest share of CFIs' total assets (about 44% in 2022). They are followed by groups primarily engaged in the production of non-financial products and services. Among the CFIs owned by finance and insurance groups, 80% of the assets are owned by investment funds. Within these investment funds, those focusing on private equity or real estate assets hold 90% of CFIs' total assets.

[104] Resident and non-resident investment funds specialising in private equity or real estate own 32% of the total assets held by Luxembourg-based CFIs.

[105] Examples of investors include pension funds, endowment funds, funds of funds, sovereign funds and family offices.

Figure 3

Stylised structure of a private equity fund or an REIF



Source: Adapted from Di Filippo (2023)[106].
Notes: The target assets may be a private company (for private equity funds) or a real estate property (for real estate funds). E_PI_L and D_PI_L stand for portfolio investment through equity or debt respectively, E_DI_A and D_DI_A for direct investment through equity or debt respectively, NFA for non-financial assets and L_OI_L for loans as other investments.

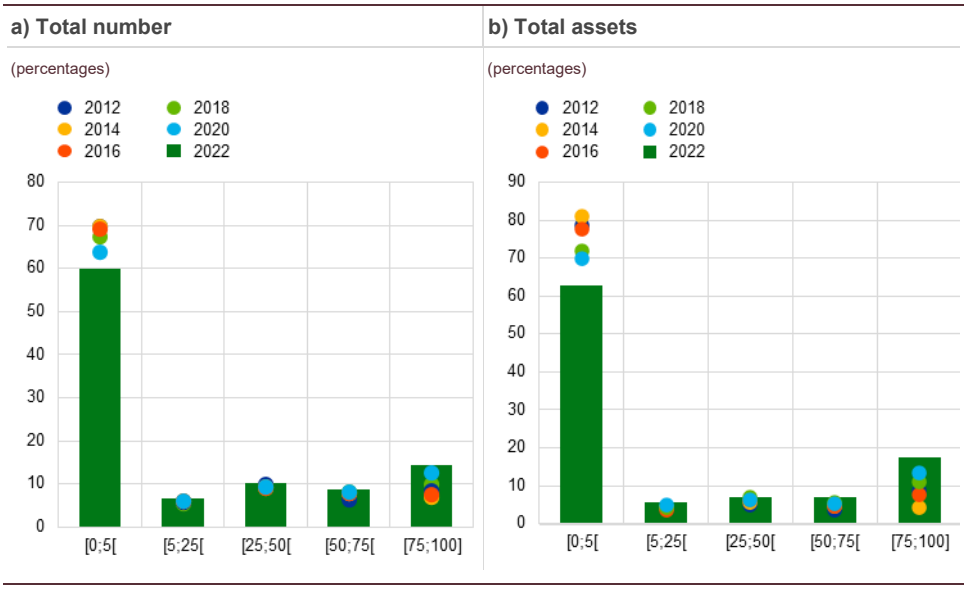
CFIs are primarily interconnected with each other, but certain types of CFI also have links with other financial entities. Due to the hierarchical structure described above, CFIs are primarily interconnected with other CFIs within their respective fund structures (Figure 3), creating internal (or intragroup) financial linkages. These often take the form of direct investment positions between resident CFIs, involving equity and/or intragroup loans. At the aggregate level, these intra-Luxembourg positions are large, with 62% of assets and 58% of liabilities of CFIs linked to counterparties in Luxembourg. However, within these fund structures, certain types of CFI also establish links with financial entities outside the group. These connections are mainly with banks that provide loans to CFIs, and other financial investors, typically private

[106] Di Filippo, G. (2023), "Alternative Distributions of Foreign Direct Investment Stocks: Evidence from Captive Financial Institutions affiliated to Private Equity and Real Estate Investment Funds in Luxembourg", *Working Papers*, No 169, Banque centrale du Luxembourg, January.

debt funds, that purchase debt securities issued by CFIs. At the aggregate level, this indicates that most CFIs are not reliant on loan financing to a significant degree. In 2022 CFIs with a credit exposure of less than 5% of their liabilities constituted 60% of all CFIs associated with private equity funds or REIFs, and they accounted for 63% of total assets (Chart 23). While most CFIs have a low credit exposure, over 23% of them rely on loans as their primary source of funding. The remainder of the analysis focuses on CFIs that use loans as their main source of funding, as they have the highest exposure to external lenders. In 2022 the credit exposure of these CFIs averaged 70% of their liabilities. They represent 15% of all CFIs linked to private equity or real estate funds and hold a 10% share of total assets. These CFIs are typically close to the actual investment in the hierarchy, with equity shares and non-financial assets (usually real estate) owned by the borrowing CFIs often pledged as collateral. Consequently, loans issued to these CFIs can be considered as senior secured debt. The external lenders are generally not resident in Luxembourg and are typically located in the same region as the investments.

Chart 23

Proportion of Luxembourg CFIs across ranges of the loan-to-liability ratio



Source: Di Filippo (2025)[107].
Notes: The x-axis shows the intervals comprising the value of the bank loan-to-liability ratio. The chart only refers to CFIs related to real estate and private equity.

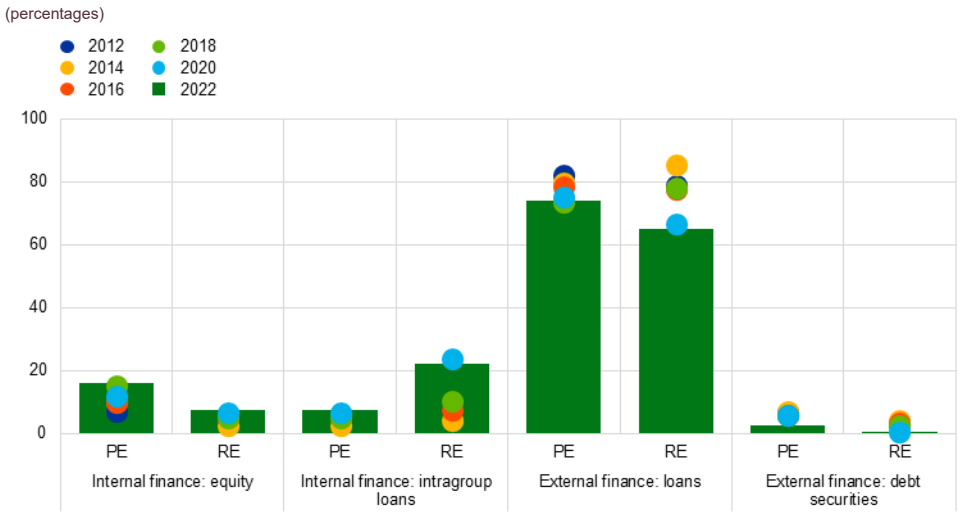
CFIs using loans as the main source of financing for private equity acquisitions are slightly more leveraged than those investing in real estate funds. As of 2022 CFIs using loans as their primary funding source for acquiring private companies were, on average, financed 25% through internal financing (equity provided by limited partners and intragroup loans) and 75% through external financing (mostly in the form of loans) (Chart 24). These loans should theoretically be reported as leverage under the AIFMD. However, reporting depends on certain

[107] Di Filippo, G. (2025), "An Analysis of the Relationship between Captive Financial Institutions and External Lenders", *Working Papers*, No 197, Banque centrale du Luxembourg, April.

conditions[108], so private equity funds may report low leverage under the AIFMD. The use of leverage might be high and located among intermediated entities.[109] Therefore, a look-through approach, considering debt financing raised via intermediate entities, is necessary to effectively gauge the leverage of private equity funds. By comparison, CFIs investing in real estate properties are financed 35% internally and 65% externally (largely by loans).

Chart 24

Target financing for Luxembourg CFIs using loans as a primary financing source



Source: Di Filippo (2025, ibid.).
Note: Average ratio across CFIs with loans as a primary financing source.

Banks play a pivotal role as the primary lenders to those CFIs that rely on loans as their main source of funding. In 2022 banks accounted for 90% of loans to these CFIs. Lending by banks, which include commercial banks, universal banks, investment banks and private banks, consists almost exclusively of direct lending. Non-bank lenders, such as investment funds, insurance corporations and pension funds, provide the remaining loans.

Most of the funding granted to CFIs using loans as their primary source of financing is used to finance real estate assets. As shown in Chart 25, in 2022 60% of the stock of loans granted to CFIs using loans as their primary funding source was used for real estate investments, while the remaining 40% went to private equity investments. In Chart 25, a higher proportion of the stock of loans finances real estate targets, although private equity investments are relatively more leveraged than real estate investments (Chart 24). This is because, when focusing on CFIs with loans as the primary financing source, loans finance a higher number of real estate investments compared with private equity investments. The financing of real estate investments is mainly supported by German lenders, who account for 51% of the total loans in this sector. By contrast, US lenders are the largest

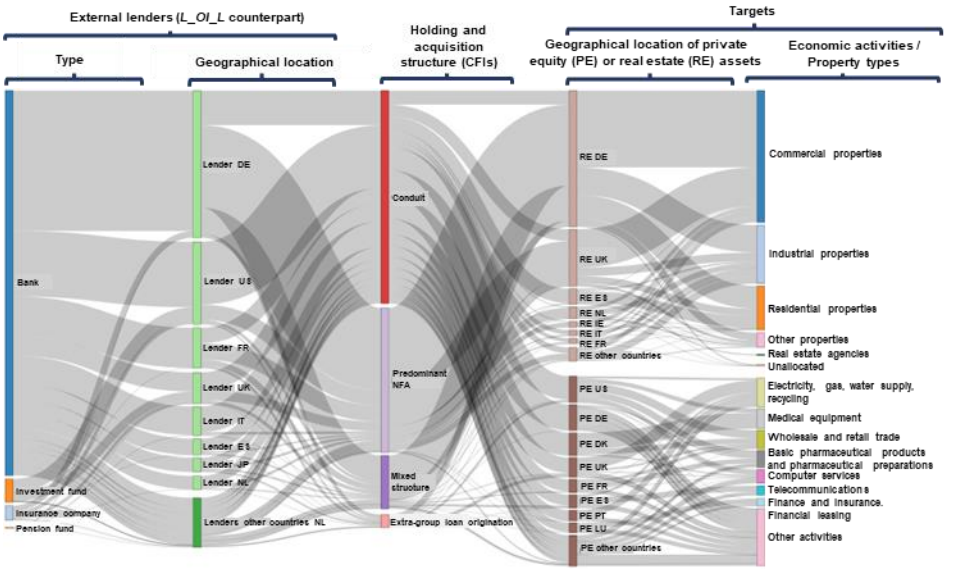
[108] For details, see "Section VII: Calculation of leverage" in European Securities and Markets Authority (2023), "Questions and Answers: Application of the AIFMD", June, pp. 41-43.

[109] For details, see the special feature entitled "Financial stability risks related to private finance" in European Systemic Risk Board (2024), "EU Non-bank Financial Intermediation Risk Monitor 2024", June.

providers of finance for private equity investments, contributing 32% of the total loans in that area. Of the real estate investments, 52% are in commercial properties, mainly office buildings, 23% in industrial properties, mainly logistics facilities, and 16% in residential properties. These real estate investments are primarily located in western Europe, with a strong focus on Germany and the United Kingdom. Private equity investments are spread across various economic activities (including 18% in utilities and 12% in medical equipment companies), with most of the target companies located in western Europe.

Chart 25

Breakdown of investment positions in loans: evidence from Luxembourg CFIs with loans as a primary financing source and affiliated to private equity funds or REIFs



Source: Di Filippo (2024, ibid.).
Notes: External lenders (L_OI_L – loan as other investments – counterpart) are consolidated at group level. The chart shows the flow of funds. The first two columns show the sector and region of the external lender. The third column shows the structure of the CFI in question. The fourth column shows the location of the target investment, and the last column shows the type of investment. Period: 2022.

The CFI sector exhibits vulnerabilities related to interconnectedness and leverage. CFIs are the largest category of OFIs, and yet relatively little is known about their use of leverage and the intermediation chains they engage in at the EU level. While Luxembourg is the largest country for CFIs in terms of assets, these companies are also large in other EU countries. An analysis of the ownership structure and reliance on external financing could help identify linkages with the rest of the financial sector and associated risks. Furthermore, harmonised data at the EU level would make it easier to understand the risks related to CFI activities.

3 Activity-based monitoring

Activity-based monitoring complements the rest of the NBFI Monitor, providing a broader understanding of financial stability risks. The entity-based monitoring presented in Section 1 may not capture all aspects of systemic risks, in particular those that may arise in specific markets and that cut across entities. Complementing entity-based monitoring with activity-based monitoring sheds further light on the use of certain financial instruments and the type of markets in which investment funds and OFIs interact with each other and with entities outside the monitoring framework. Thus, it provides further insights from a systemic perspective into the nature of risks that may arise due to these activities.

3.1 Derivatives

Table 5

Main risks of derivatives

Interconnectedness	Use of derivatives can create complex intermediation chains, which can include various financial sectors and asset classes.
Leverage risk	Use of derivatives can increase market risk exposure beyond risk-bearing capacities.
Liquidity risk	Margin calls may create liquidity issues for some market participants when market movements are large and unexpected.
Counterparty risk	Insufficient margining can lead to unintended market exposures in the event of counterparty default.

The EU derivatives market had a total gross notional outstanding amount of €410 trillion across 32 million open trades at the end of 2024, marking an increase of €47 trillion from the previous year. EMIR data show that interest rate derivatives remained the largest part of the market, accounting for 81% of notional amounts outstanding, followed by 11% in FX derivatives and the remaining 7% in equity, credit and commodity derivatives (Chart 26, panel a). OTC contracts represented 95% of the total gross notional amount in the fourth quarter of 2024, unchanged from the previous year, while exchange-traded derivatives (ETDs) accounted for 5%. These percentages mask large differences across different types of derivatives. For example, equity and commodity derivatives are more often exchange-traded (57% and 23% in terms of notional amounts respectively at the end of 2024), whereas interest rate and FX derivatives are almost exclusively traded over the counter.

In 2024 central clearing rates increased for credit derivatives subject to a clearing obligation in the EU. The proportion of the gross notional outstanding amount for OTC credit and interest rate derivatives that were centrally cleared stood at 52% and 77% respectively at the end of 2024, unchanged for interest rates and up 2 percentage points for credit derivatives. Initial margins remained stable throughout 2024 (Chart 26, panel b), with a slight decline for equities between the first and

fourth quarters of 2024, reflecting lower volatility, and a slight increase for interest rate derivatives, related to monetary policy uncertainty. The move towards central clearing has reinforced the link between market and liquidity risk by translating price volatility into margin calls and collateral requests.[110]

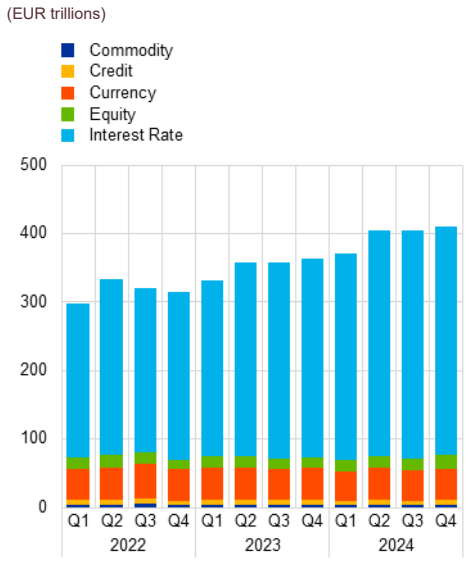
Non-banks (investment funds and OFIs) accounted for €61 trillion in outstanding notional amounts in the fourth quarter of 2024, down from €99 trillion a year earlier. Investment funds contributed €10 trillion, down from €12 trillion in 2023, while investment firms accounted for €51 trillion in 2024, a decrease of €36 trillion. Over the same period, banks increased their notional amount outstanding by €79 trillion, rising to €302 trillion from €223 trillion a year earlier. For ICPFs, it rose by €4 trillion to €8 trillion, while for central counterparties (CCPs), it increased by €2 trillion to €27 trillion. Interest rate derivatives, particularly swaps, accounted for the majority of these changes, with their outstanding amounts trending downwards for investment firms but upwards for banks throughout 2024. At the end of 2024 the share of the total gross notional amount outstanding for non-banks was 14% for interest rate derivatives, 20% for credit, 12% for currencies, approximately 35% for equities and 16% for commodities. These shares significantly declined across asset classes over the course of the year, in line with the overall substantial reduction, except for equities, which fell by only 3 percentage points. As in previous years, almost all non-bank exposures are associated with large investment firms. Since some of the banks' exposures are on behalf of non-bank clients that do not report directly under EMIR, however, these figures may understate the derivative exposures of non-bank financial intermediaries to some extent.

[110] See European Systemic Risk Board (2025), "Systemic liquidity risk: a monitoring framework", February.

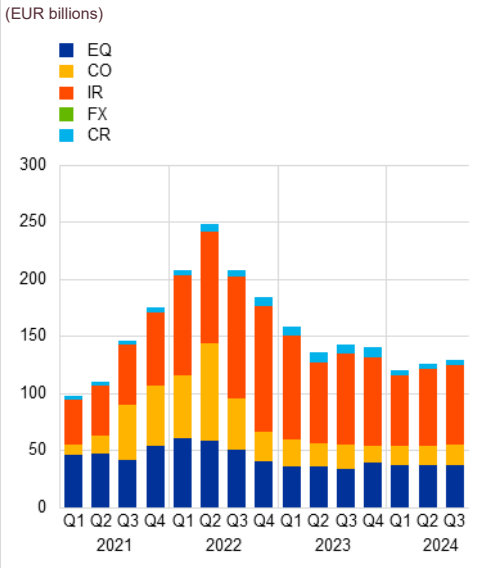
Chart 26

Derivatives markets are still dominated by interest rate derivatives, most of which were traded OTC and cleared

a) Gross outstanding notional amounts in the EU, by asset class and quarter



b) Outstanding amounts of initial margin required and excess collateral received by EU27 CCPs for derivatives



Sources: Trade repositories and ESMA.
Notes: Panel b): EQ stands for equity, CO for commodity, IR for interest rate, FX for foreign exchange and CR for credit. Outstanding amounts of initial margin required and excess collateral received by EU27 CCPs for derivatives. Margins pre-haircut used post-REFIT (after Q1 2024) except for Eurex Clearing AG due to data gaps.

3.2 SFTs

Table 6

Main risks of SFTs

Counterparty risk	During volatile periods, the price of collateral might fluctuate widely. In the case of non-centrally cleared SFTs, if the price declines by more than the haircut applied to collateral and the borrower fails to pay the repurchase price, the market value of the collateral will not cover the lender's losses resulting from the counterparty's default. If, on the other hand, the price increases and the lender fails to deliver the security, the borrower will be exposed to losses from the counterparty's default.
Leverage	SFTs can enable institutions to increase their exposures via secured borrowing.
Reinvestment	If cash collateral is reinvested in volatile/illiquid assets, the counterparty may suffer losses, which may in turn result in a more widespread spillover to unsecured funding markets.
Liquidity	SFTs typically have short maturities but may be subject to a drop in activity (and hence liquidity), especially at the end of a quarter, thus exposing market participants to funding liquidity risk. Moreover, additional collateral requests might result in liquidity strains for borrowers during stress periods.
Procyclicality	During periods of stress, counterparties may face liquidity demands from higher haircuts and a decline in the value of collateral. Procyclicality associated with margining and haircut practices may increase contagion risks.

According to industry surveys, the total amount of the European (EU and UK) repo market decreased by 0.4% year on year to €10.9 trillion in December 2024 (Chart A33, panel a).[111] The slight drop was likely driven by the tightening of liquidity at higher interest rates. In this vein, the share of securities-driven trading is giving way to more cash-driven repo activity. The share of US Treasuries in the collateral holding in the survey sample increased slightly to a new all-time high of 15.7% from 15.4% in June. This reflects market expectations of interest rate cuts by the Federal Reserve System, which increases the potential of trading activity and a record new issuance of US Treasuries. The use of some government bonds in European repo markets has increased (e.g. Italy), while other markets have witnessed a decrease (e.g. Germany).

According to EU regulatory data, outstanding repo activity reported by European Economic Area (EEA) counterparties amounted to €6.3 trillion in December 2024.[112] Turnover averaged €2.8 trillion per day in the EU during 2024, representing a rise of 16.7% from the 2023 average. The faster growth in the overall market coincided with a decrease in the share of central clearing, which fell to 43.1% in December 2024 from 46.3% in December 2023. The average term to maturity of centrally cleared repos decreased in 2024. In terms of value, central clearing in the EU increased by 15% in the second half of 2024, while in terms of shares, there was a decrease in centrally cleared repos in the EU by 3.3% in the same six months.

Securities lending activity remained strong in 2024, sustained by robust demand. SFTs involving European government bonds remained stable despite the contraction of interest rates, given the ECB's desire to support growth considering challenges in the economic outlook.[113] Average loan balances increased by 15% year on year to USD 424 billion in 2024, while average utilisation (ratio of assets on loan to lendable assets) rose to 6%. Additionally, the amount of lendable assets increased to USD 1.4 trillion.

Financing conditions for EUR-denominated SFTs tightened in the fourth quarter of 2024.[114] The tightening of overall credit terms and conditions was reflected in both price and non-price terms being in line with expectations. Market respondents indicated that the tightening was mainly attributable to the deterioration in market liquidity. While funding against high-quality non-financial corporate bonds and asset-backed bonds remained unchanged, it decreased for high-quality government bonds. There was an overall increase in the maximum maturity of funding secured against government bonds, corporate bonds, convertible securities and equities. Finally, financing rates and spreads and demand for funding across all collateral types have increased.

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111 Data from the International Capital Market Association based on a survey completed by 61 offices in December 2024.

112 Data reported under the SFTR available here. This estimate includes all executed transactions that have not yet matured as of the date of reporting and excludes all repo transactions that have not yet been contractually initiated (forward repos).

113 See IHS Markit and S&P Securities Finance Quarterly Reviews for H2 2022, H1 2023, H2 2023, H2 2024 and FY 2024.

114 See European Central Bank (2024), "Survey on credit terms and conditions in euro-denominated securities financing and OTC derivatives markets (SESFOD)", December.

The interconnectedness between banks and the monitoring universe using repo transactions is particularly notable. The average share of banks' repo transactions with non-MMF investment funds and OFIs increased to 48% of total bank repo transactions in 2024, compared with 41% in 2023 (Chart A34). Conversely, the average share of banks' repo liabilities to CCPs decreased to 38% in 2024, compared with 47% in 2023.[115] However, its relative importance decreased, as bank repo transactions with CCPs amounted to around 44% on average of all bank repo transactions in 2024, compared with 56% of transactions in 2023. A surge in market volatility could result in higher margin calls, which constitute an adverse funding shock for entities that fund themselves in the repo market and could be transmitted to the banking sector.[116]

3.3 Securitisation

Table 7
Main risks of securitisation

Interconnectedness	Interconnections through securitisation open contagion channels between financial institutions, as well as across sectors and the whole economy.
Leverage	Securitisation may create excessive leverage in the financial system, fuelling a rise in asset prices and overindebtedness across borrowers.

Securitisation can bring several economic benefits and promote economic growth, but when inadequately structured, regulated or supervised, it can also pose risks to financial stability. The global financial crisis demonstrated how securitisation can contribute to excessive risk-taking within the financial sector when it flourishes and develops out of misaligned incentives allowing room for moral hazard. Since the crisis, a range of regulatory reforms have been introduced to the securitisation markets to address the misalignment of incentives that occurred in certain securitisation structures.[117] In the EU, these reforms culminated in the adoption of the EU Securitisation Regulation (SECR) in 2017. The SECR assigned the macroprudential oversight of the EU securitisation market to the ESRB. As part of this mandate, in May 2025 the ESRB published a report entitled "Unveiling the impact of STS on-balance-sheet securitisation on EU financial stability". Among other things, the report concludes that extending the STS framework to synthetic securitisation has not, to date, resulted in significant risks to financial stability in the EU. However, it also warns that the relaunch of the securitisation market must be accompanied by close risk monitoring and an assessment of risks arising from procyclical effects and interconnectedness. In contrast to "true sale" securitisations, where the assets are removed from the originator's balance sheet, in synthetic securitisations the assets remain on the balance sheet and only the credit risk is transferred synthetically to investors, typically via a contingent contract (a derivative

[115] This relates to all repos reported by banks vis-à-vis central counterparties.

[116] See European Systemic Risk Board (2025), "Systemic liquidity risk: a monitoring framework", February.

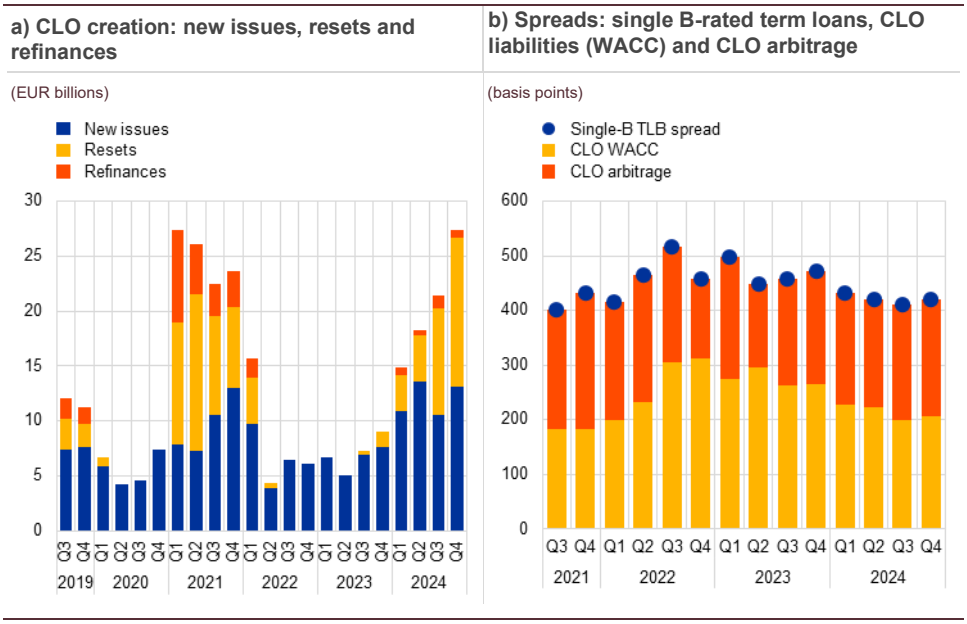
[117] For more on the regulatory changes after the global financial crisis, see Financial Stability Board (2025), "Evaluation of the Effects of the G20 Financial Regulatory Reforms on Securitisation – Final report", January.

or a credit-linked note) or financial guarantees. Box 3 provides a concise overview of the investors involved in EU STS synthetic securitisation. The remainder of this subsection therefore focuses on traditional securitisation.

In 2024 there was a large increase in the issuance of securitised products in Europe[118], primarily accounted for by collateralised loan obligations (CLOs). The total volume of securitised products issued rose by 15% compared with 2023 (Chart A27). RMBSs accounted for 50% of the issuance but remained unchanged from 2023. The overall rise in the issuance of securitised products was mainly attributable to an increase in CLO issuance of nearly €50 billion or 88% compared with the previous year. In addition to active new issuance, the CLO market also showed a dynamic reset and refinance market (Chart 27, panel a). Overall CLO issuance was bolstered by improving arbitrage and muted volatility, as CLO liabilities tightened, but assets, primarily single B-rated term loans, did not compress to the same degree (Chart 27, panel b). This has led to enhanced arbitrage facilitating issuances, particularly for resets and refinances, which accounted for 41% of CLO total issuance in 2024.

Chart 27

European CLO issuance and spreads



Source: PitchBook Data, Inc.

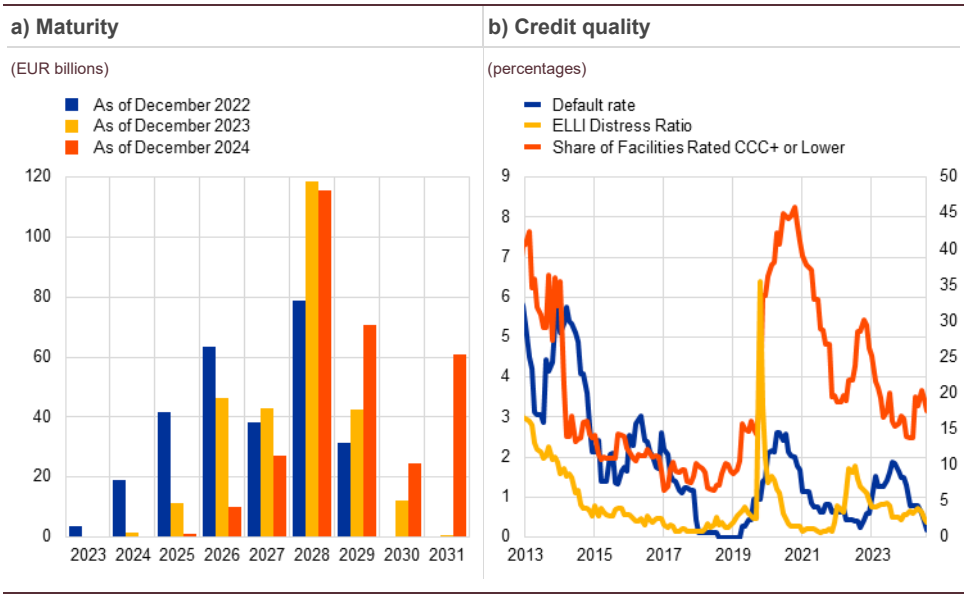
The primary market for leveraged loans was also very dynamic in 2024, with some indicators of credit quality for the European Leveraged Loan Index (ELLI) improving. Similar to the CLO market, the leveraged loan market also experienced an increase in activity. This was primarily driven by refinancing activities, along with leveraged buyouts (LBOs), recapitalisations and other mergers and acquisitions (M&A) transactions. As shown in Chart 28, a substantial portion of leveraged loans originally maturing in 2025-26 has been refinanced. This extension of maturity may provide some relief for issuers amid considerable economic

[118] Including non-EU countries, such as the United Kingdom.

uncertainty. Regarding credit performance, default rates for European leveraged loans decreased in 2024, with the loans underlying ELLI recording a 12-month trailing default rate of 0.42% at the end of the year. Further signs of credit improvement were also evident in loan pricing, with the ELLI distress ratio declining from 3.96% to 2.21%. Finally, the share of high-risk loans (facilities rated CCC or below) remained in line with the level observed at the beginning of 2024.

Chart 28

Maturity and credit quality for European leveraged loans



Source: PitchBook Data, Inc.
Notes: The European Leveraged Loan Index (ELLI) distress ratio is a metric used to assess the health of the European leveraged loan market. It represents the percentage of loans within the index that are trading below a specific price threshold, typically signalling financial distress. This threshold is set at 80% of the loan's face value.

CLO credit risk is primarily transferred to non-euro area investors. Most investors across the CLO capital structure are located outside the euro area. Among euro area investors, banks, investment funds and insurance corporations have the largest presence. Banks predominantly hold AAA-rated exposures, while investment funds participate across the entire capital structure. Insurance corporations are mainly involved in AAA and senior mezzanine tranches. This distribution underscores the risk-sharing benefits of CLOs but also highlights the potential for contagion if leveraged loan or CLO markets come under stress.

Box 3

Investors in simple, transparent and standardised synthetic securitisations

In contrast to "true sale" securitisations, where the assets are removed from the originator's balance sheet, in synthetic securitisations the assets remain on the balance sheet. Instead, the credit risk of those assets is transferred synthetically to third-party investors, typically via a contingent contract (a derivative

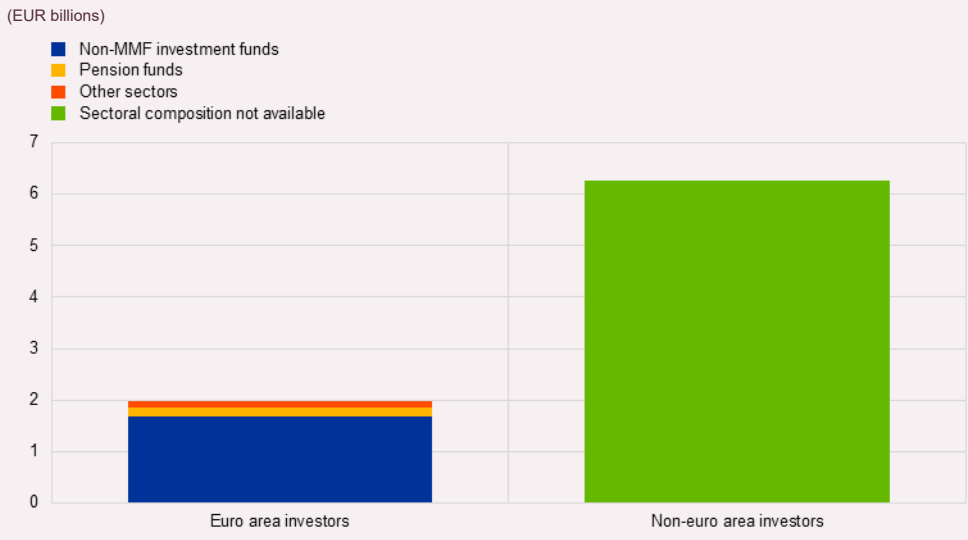
or a credit-linked note) or financial guarantees. In recent years, this segment of the securitisation market has experienced strong growth, with the total outstanding amount reaching €358 billion in the first half of 2024, compared with €200 billion in the first half of 2021. This evolution can be attributed at least partially to the extension of the simple, transparent and standardised (STS) label to synthetic securitisations in 2021.

While securitisation can improve risk sharing throughout the financial system, it also poses potential risks to financial stability, as demonstrated by the global financial crisis. The combination of leverage, low liquidity and significant interconnectedness inherent in securitisation can lead to the rapid spread of risks throughout the financial system. To shed light on these risks and vulnerabilities, the ESRB recently published the report "Unveiling the impact of STS on-balance-sheet securitisation on EU financial stability", assessing the financial stability risks of the extension of the STS label to the synthetic securitisation market.

Although the STS synthetic securitisation market remains small, examining its investor base provides insights into potential sources of systemic risk and transmission channels, should the market continue to rapidly expand. Data on the STS synthetic securitisation investor base indicate that credit risk is largely transferred to non-EU entities. The ECB's securities holdings statistics by sector (SHSS) dataset shows that, within the euro area, most STS synthetic credit-linked notes (CLNs) are held by investment funds, while pension funds hold a smaller share (Chart A). The SHSS data align with global industry data, which also suggest that investment and pension funds are the main investors. From a financial stability perspective, the transfer of risks outside the EU regulatory perimeter may enhance risk sharing but also increases market opacity.

Chart A

Sector of investors in STS synthetic CLNs



Sources: ESMA, ECB (SHSS, CSDB) and ESRB calculations.

EU investment funds involved in STS synthetic securitisations often face liquidity mismatches and sometimes employ leverage. The diversity of these funds is reflected in the wide range of investment policies they follow, including hedge funds (19% of net asset value), mixed and bond funds (14% each) and a large residual category. Around two-thirds are open-ended alternative investment funds, which are subject to liquidity mismatch as the bonds providing exposure to the securitisations are illiquid. This liquidity mismatch may be amplified by leverage. According to AnaCredit data, approximately €165 million in loans has been extended by euro area credit institutions to EU investment funds holding CLNs. While the total exposures of these funds to CLNs remain unknown, the data reveal that the risk transferred out of the banking system through STS synthetic securitisations can be partially cycled back to the banking sector. In some cases, leverage is provided by the bank originating the STS synthetic securitisation.

In its current state, the STS synthetic securitisation market poses low risk to financial stability in the EU. Nevertheless, this could change with significant market growth or future regulatory changes that introduce systemic risk into the market. Against this background, close monitoring of the interconnectedness and risk amplification channels between originators (the banking sector) and investors (non-bank financial intermediaries) is essential.

3.4 Crypto-assets, CeFi and DeFi

Table 8

Main risks of crypto-assets, CeFi and DeFi

Leverage	Excessive leverage multiples offered to retail investors on crypto exchanges or DeFi protocols through margin lending and derivatives are common in crypto.
Market risk	Leverage coupled with crypto-assets' speculative nature, i.e. lack of underlying cash flows or claims on tangible assets, cause and amplify boom and bust cycles.
Liquidity risk	Several crypto business models rely on maturity and liquidity transformations but do not have appropriate safeguards in place and are thus vulnerable to "runs".
Credit risk	Predominantly stemming from opaque business structures and unsustainable business models that have frequently resulted in defaults.
Operational risk	Novel and fast-evolving technology, combined with evolving mandatory standards and regulatory surveillance of crypto businesses, allow for unintentional failures and malevolent misconduct.
Interconnectedness	Very high interconnectedness within the crypto ecosystem and growing linkages with traditional markets, although these linkages remain relatively small at this point. Regulatory support in the United States is likely to accelerate crypto institutionalisation and greater connections between crypto and traditional finance.

The market valuation of crypto-assets surged to €3.3 trillion by the end of 2024, marking year-on-year growth of 114% (Chart 29, panel a). This boom was primarily driven by the long-awaited approval of spot bitcoin ETPs by the US Securities and Exchange Commission (SEC) in January 2024 and the anticipation of an overtly crypto-friendly US Government following Donald Trump's election win in November 2024. The two events sparked investor enthusiasm, propelling crypto valuations to new record highs. Bitcoin, which alone accounts for more than half of

the total crypto market size, surpassed the USD 100,000 mark for the first time in December 2024 and closed the year with a 138% increase in price over 12 months. Other major crypto-assets recorded substantial gains, with Ether up 47%, Ripple 234%, Binance Coin 126% and Solana 88%. Several prominent meme coins[119], buoyed by significant social media activity, saw explosive growth in value. Dogecoin, the largest and often promoted by Elon Musk, soared 251% over the year. Meanwhile, the year was punctuated by brief periods of heightened volatility, notably in August when crypto prices plunged amid deteriorating macroeconomic conditions. Trading volumes rebounded from their 2023 lows to levels seen before the big crypto bust (collapse of FTX) in 2022. November and December 2024 witnessed trading volumes more than double compared with the 2024 average in the wake of the market rally and the frenzy surrounding meme coins.

The risks to financial stability from crypto-assets appear contained, however they are growing and warrant monitoring. Crypto-assets remain small in size relative to global financial assets, accounting for less than 1% despite their strong growth in 2024.[120] The connections between crypto and traditional markets, as well as the real economy, while increasing, are still small. Crypto-assets are not widely used in critical financial services, including payments, and the exposure of financial institutions to crypto-assets remains small. For instance, in the EU, euro area significant institutions' direct holdings of crypto-assets are limited (around €1 million). These institutions provided €4.7 billion of custody services related to crypto-assets and crypto-related investment products in 2024, up from around €400 million in 2023. Banks increasingly offer crypto-related services such as brokerage and trading.[121] Yet, at a global level, the crypto-friendly stance adopted by the US Administration following Donald Trump's re-election in November 2024 is a major shift and could accelerate greater interconnectedness between crypto and traditional markets in the United States, and in turn globally. President Trump campaigned on a commitment to support crypto-assets. Since his entry into office, he has issued executive orders to promote the use of crypto-assets and emphasised the need to embrace crypto-assets to drive economic growth.[122] He is also a supporter of US dollar-backed stablecoins. Meanwhile, the US SEC has dismissed multiple investigations and lawsuits against crypto firms. Other US authorities have also issued guidance or rescinded previous requirements, effectively making it easier for traditional financial institutions to engage in crypto activities.[123] These developments

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119 Meme coins are a type of crypto-asset that originate from internet memes and jokes. An internet meme is a cultural item, such as an idea or behaviour, that spreads across the internet primarily through social media platforms.

120 The London Stock Exchange Group estimated the total global financial assets at USD 1,088 trillion in 2024. See London Stock Exchange Group (2024), "The size of global markets 2024 in charts".

121 See European Central Bank (2025), "Financial Stability Review", May.

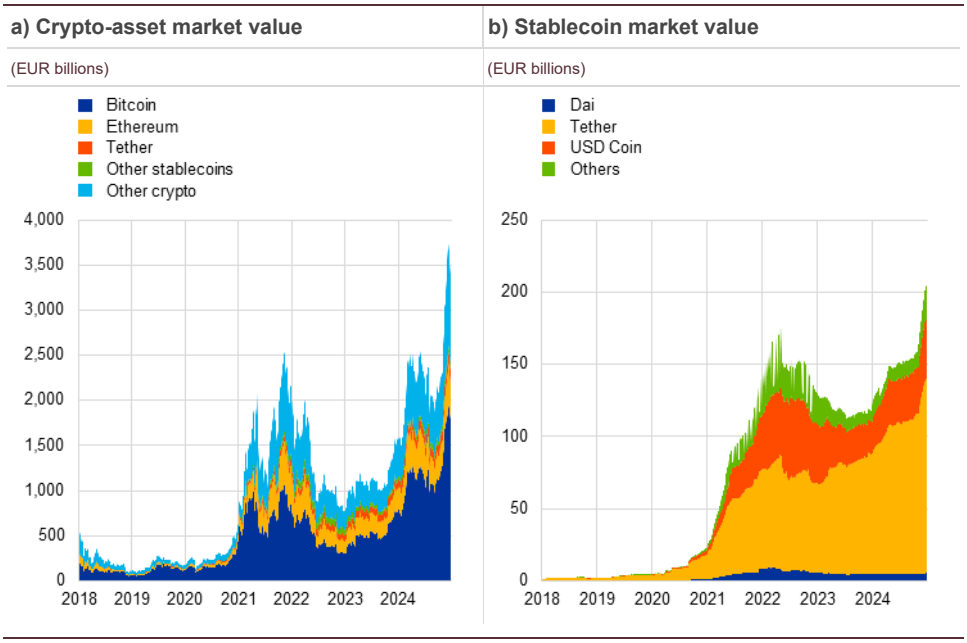
122 See the executive order of 23 January 2025 to establish United States leadership in digital financial technology and the executive order of 6 March 2025 to establish the strategic Bitcoin reserve and US digital asset stockpile.

123 See "FDIC Clarifies Process for Banks to Engage in Crypto-Related Activities", *press release*, Federal Deposit Insurance Corporation, 28 March; "OCC Clarifies Bank Authority to Engage in Certain Cryptocurrency Activities", *press release*, Office of the Comptroller of the Currency, 7 March; "OCC Clarifies Bank Authority to Engage in Crypto-Asset Custody and Execution Services", *press release*, Office of the Comptroller of the Currency, 7 May; and "Federal Reserve Board announces the withdrawal of guidance for banks related to their crypto-asset and dollar token activities and related changes to its expectations for these activities", *press release*, Board of Governors of the Federal Reserve System, 24 April.

require monitoring, because they increase the risks of negative spillover effects from crypto to traditional markets. The growth of crypto investment products and stablecoins in particular warrant attention, as they could potentially act as vectors for risk transmission between crypto and traditional markets. Crypto investment products eliminate the complexities of direct ownership and make it easy for investors to gain exposure to crypto-assets, which increases the risk of negative wealth effects if there are significant price drops. Many stablecoins are also backed by traditional financial assets. In the EU, MiCAR introduces stringent requirements for electronic money token (EMT) (stablecoin) issuers, including prudential and governance rules, as well as obligations regarding the composition and management of stablecoin reserves. In January 2025 ESMA issued a public statement requiring crypto-asset service providers to cease services related to non-compliant stablecoins.[124] Potential cross-border issues can also arise in the domain of stablecoins. An example of this is if an EU firm and a third-country firm issue the same token (also called a "multi-issuer scheme with a third-country leg"). As MiCAR does not include any provisions disciplining this particular case, it can significantly weaken the EU prudential regime for EMT issuers. Indeed, it increases the likelihood of a run as EU issuers may not have enough reserve assets under the supervision of EU authorities to fulfil redemption requests by both EU and non-EU token holders.

Chart 29

Crypto-assets and stablecoins grew in 2024



Sources: CoinMarketCap and ESMA.

The stablecoin market experienced significant growth in 2024, with its total value increasing by 73% to €204 billion (Chart 29, panel b). This represents about 6% of the total crypto market capitalisation, yet it remains small compared with global financial assets. Tether USD continues to dominate the stablecoin market, although its relative share has decreased from 70% to 65%. Due to its relatively

[124] European Securities and Markets Authority (2025), "Public statement on the provision of certain crypto-asset services in relation to non-MiCA compliant ARTs and EMTs", January.

small size compared with global financial assets, Tether does not currently pose a threat to financial stability. However, its prominence among stablecoins, which are crucial to crypto-asset markets, renders it systemically relevant for those markets. For example, concerns about its reserves or potential cyber incidents could have significant ripple effects within the crypto ecosystem. In the EU, several issuers of EMTs[125] have submitted MiCAR white papers following the implementation of Titles III and IV of the regulation on 1 July 2024. Nevertheless, EUR-denominated stablecoins remain marginal in size at this stage.

The launch of spot crypto ETPs in the United States marked a significant milestone for crypto-assets and their broader adoption, including by institutional investors. Spot Bitcoin ETPs recorded cumulative net inflows of more than €34 billion over 12 months, highlighting strong investor interest. Their combined NAV totalled €102 billion at the end of the year. By contrast, spot Ether ETPs had a comparatively modest reception, with net inflows of only €2.6 billion following their launch in July and a total NAV of €12 billion at the end of December 2024. In the EU, available data suggest that investment funds providing exposure to crypto-assets or blockchain technology more broadly represent a minuscule portion of the EU fund universe (0.02%), with a combined NAV estimated at around €4 billion.[126] ETPs with crypto underlyings listed in the EU also remain relatively small, with a combined value estimated at around €8 billion[127], compared with €14.8 trillion for the ETF/ETP industry globally.[128] EU derivatives contracts with crypto-assets as underlyings reported under EMIR had a total notional value of €6 billion in January 2025[129], which is again very small relative to the size of EU derivatives markets (€314 trillion as at year-end 2022).

Although DeFi remains a niche market, even as the number of DeFi protocols continues to grow, the ESRB has published a policy digest describing how crypto-assets mirror activities performed by the traditional financial system but are not regulated in a consistent way.[130] The total value locked (TVL) in DeFi protocols has increased in line with the appreciation of crypto-assets, rising from €45 billion in December 2023 to nearly €114 billion by the end of December 2024. This represents approximately 4% of total crypto market capitalisation. A high concentration is evident among DeFi protocols, with the three largest – Lido, Aave and EigenLayer – comprising around 30% of the total TVL. In January 2025 the EBA and ESMA published their contribution to the European Commission's report to the EU Parliament and Council on recent developments in crypto-assets as mandated

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125 MiCAR does not use the term "stablecoin", which is primarily a marketing term, but EMTs and asset-referenced tokens (ARTs) could be considered as such. MiCAR defines an EMT as a type of crypto-asset that purports to maintain a stable value by referencing the value of one official currency. It defines an ART as a type of crypto-asset that is not an EMT and that purports to maintain a stable value by referencing another value or right or a combination thereof, including one or more official currencies.

126 Source: ESMA estimates based on a screening of commercial databases and AIFMD reporting data.

127 Source: ESMA estimates based on Eikon data.

128 Source: LSEG & ETFGI. See ETFGI (2025), "ETFGI reports the global ETFs industry gathered a record 1.88 trillion US dollars during 2024", *press release*, 16 January.

129 Sources: ESMA and EMIR data.

130 See Policy Digest 4 in European Systemic Risk Board (2024), "A system-wide approach to macroprudential policy", November.

under Article 142 MiCAR in the form of a joint report.[131] In particular, the report highlighted that DeFi remained a niche phenomenon and that EU adoption of DeFi, while above the global average, was behind other developed economies. In the aforementioned policy digest, the ESRB explored the opportunity of regulating activities involving crypto-assets not yet fully covered by MiCAR, such as lending and DeFi activities, also proposing to clarify the line between fully and partially decentralised finance which triggers the application of MiCAR.

3.5 Private finance

Table 9

Main risks of private finance

Market risk	A large proportion of assets held within private finance pose challenges for valuations as they lack a public market.
Liquidity risk	Several business models in private finance rely on investment in inherently illiquid assets.
Interconnectedness	High interconnectedness with the rest of the financial system and the real economy.

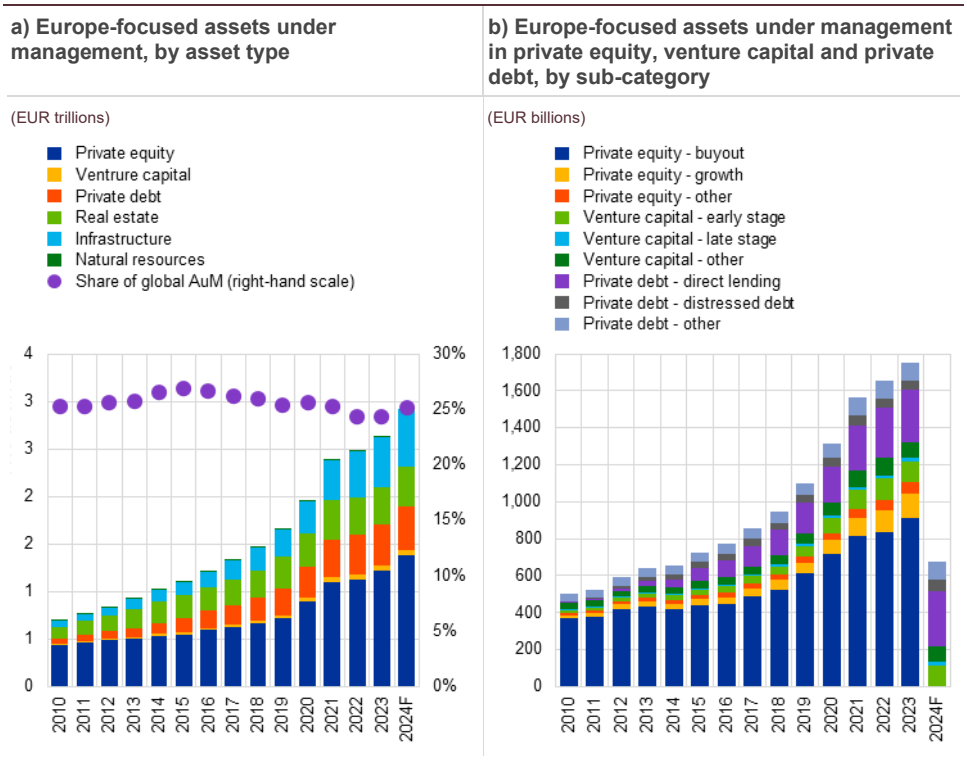
The rapid growth of private finance in recent years continues to be evident both globally and in Europe. Private finance can be broadly understood as provision of debt and/or equity finance from non-banks rather than banks or public markets. It plays an important role in the economy by providing alternative or complementary financing to companies or investment projects with high financing needs that might not meet the criteria or "risk appetite" for financing from other sources. The global size of private markets reached €11.4 trillion at the end of 2024[132], with North America being the largest market for all asset classes. European private markets amounted to €2.6 trillion and accounted for 25% of the total (Chart 30, panel a). Private equity, led by buyout strategies, and private credit, led by direct lending strategies, were the largest components of the European private finance sector (Chart 30, panel b). Both global and European private finance markets have increased more than threefold in the last ten years. This expansion might be attributed to a perception of more favourable regulatory frameworks, particularly in comparison with the stricter banking regulations introduced after the global financial crisis, as well as sustained institutional demand and the search for yield in a low interest rate environment.

[131] European Banking Authority and European Securities and Markets Authority (2025), "Recent developments in crypto-assets (Article 142 of MiCAR)", January.

[132] Discrepancies in data between publications may be attributed to the reliance on diverse commercial data providers.

Chart 30

Rapid growth in private finance in the past few years



Sources: Preqin and ESRB calculations.
Notes: Regional focus refers to the geographical focus of the investment vehicle. Forecast for 2024 assets under management. Forecasts not available for natural resources (panel a) and private equity (panel b). In panel b), PE stands for private equity, VC for venture capital and PD for private debt.

The interconnectedness between private finance and European banks has intensified, presenting both opportunities and challenges for financial stability. As private equity and private credit markets have expanded, European banks have become increasingly intertwined with these sectors through various channels, including direct financing, derivatives and partnerships with asset managers. This growing entanglement is evident in the significant, albeit heterogeneous, exposures banks hold, with a predominant focus on private equity financing. Such interconnectedness introduces complex, multi-layered risks, particularly given the leverage employed at different levels within private funds' financing chain, which can amplify vulnerabilities in times of market stress. Moreover, the opacity and fragmented nature of private finance markets make it challenging for banks to fully assess and manage these risks, as highlighted by the ECB's exploratory review.[133] Consequently, the need for sophisticated risk management frameworks and enhanced supervisory oversight has become paramount to mitigate potential systemic risks arising from this deepening integration between private finance and the banking sector.

[133] European Central Bank (2024), "Complex exposures to private equity and credit funds require sophisticated risk management", *Supervision Newsletter*, 13 November.

Annexes

See more

Imprint and acknowledgements

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Anna Maria Agresti ECB	**Konstantinos Kanellopoulos** Bank of Greece
Zeno Benetti ESMA	**Márcio Mateus** ESRB Secretariat
Antoine Bouveret ESMA and Chair of the NBEG Risk Metrics Taskforce	**Carl Nordahl** ESRB Secretariat
Filippo Bucchi ESRB Secretariat	**Mark Pooters** Autoriteit Financiële Markten
Francisca Catarino ESRB Secretariat	**Roberto Proietti** ESMA
Anne Choné ESMA	**Franck Raillon** AMF
Pierre-Emmanuel Darpeix AMF	**Paul Reddan** European Commission
Gabriele Di Filippo Banque centrale du Luxembourg	**Annegret Schäfer** Deutsche Bundesbank
Yvan Dubravica ESRB Secretariat	**Daniel Schmidt** ECB
Damien Fennell ESMA	**Alessandro Spoloare** ESMA
Massimo Ferrari ESMA	**Diego Valiante** European Commission
Paweł Fiedor ESRB Secretariat and Secretary to the NBEG	**Luis Molestina Vivar** ECB
Michael Grill ECB	**Christian Weistroffer** ECB
Anton Jevcak European Commission	

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.esrb.europa.eu

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

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