FSB FINANCIAL STABILITY BOARD

Vulnerabilities in Non-bank Commercial Real Estate Investors

19 June 2025

The Financial Stability Board (FSB) coordinates at the international level the work of national financial authorities and international standard-setting bodies in order to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies. Its mandate is set out in the FSB Charter, which governs the policymaking and related activities of the FSB. These activities, including any decisions reached in their context, shall not be binding or give rise to any legal rights or obligations.

Contact the Financial Stability Board

Sign up for e-mail alerts: www.fsb.org/emailalert
Follow the FSB on X: @FinStbBoard
E-mail the FSB at: fsb@fsb.org

Table of Contents

Executive summary

The commercial real estate (CRE) market has experienced significant stress in recent years. Certain segments, such as offices (especially in large cities) and retail space, experienced weak demand since the COVID-19 pandemic due to the shift to home working. Additional stress to these segments, and to the entire CRE sector, has been caused by the increased borrowing costs due to the monetary policy tightening that took place in 2022-23 in several jurisdictions, which depressed demand. The 2024 FSB report on the confluence of interest rate and liquidity risks in the financial system had identified, inter alia, non-bank CRE investors – comprising real estate investment trusts (REITs), property funds, and other non-bank mortgage lenders (a subset of finance companies) – as being vulnerable to higher interest rates. This report summarises the findings from additional analysis on vulnerabilities in non-bank CRE investors.

Data collected from FSB members suggest at least $12 trillion of equity and debt CRE financing from banks and non-banks. For the jurisdictions in the sample, the CRE market represented between 10% and 60% of their GDP in 2023. While banks continue to be the main source of financing for CRE, some jurisdictions have a sizeable share of non-bank investor participation, especially property funds (the dominant entity type in the European Union, South Africa and the United Kingdom) and REITs (mostly in Australia, Hong Kong, Japan and the United States). These investors reduce dependency on bank financing and provide more financing options, which can be beneficial for overall financial stability. At the same time, many of them are interconnected with banks and with each other via loan, equity and debt securities financing.

A more complete overview of all financial institutions exposed to CRE markets and the extent of interlinkages between banks and non-banks is limited by considerable data gaps, despite improvements in recent years. For example, there are typically more reporting requirements and public data for property funds and REITs than for other types of non-bank CRE investors. Information, where available, may be fragmented across authorities in the same or different jurisdictions, which may lead to hurdles in sharing it. Further attempts to close these data gaps would enhance authorities' ability to monitor non-banks' involvement in CRE at a jurisdictional and global level.

Given data availability, this report focuses on REITs and property funds and identifies three main vulnerabilities in these investor types. First, some open-ended property funds show significant liquidity mismatches and may therefore be vulnerable to runs. This is the case for funds where liquid assets represent a small share of assets under management, whilst the funds offer daily or monthly dealings for their shares. Indeed, there have been a number of instances in recent years where open-ended property funds, in the face of significant investor redemption requests, had to introduce gates or suspend redemptions due to the illiquidity in the underlying market. Implementation of the FSB's recommendations to address structural vulnerabilities from liquidity mismatch in open-ended funds would help address this vulnerability.

Second, there are pockets of high financial leverage in some REITs and property funds. This vulnerability can impact those investors and the broader CRE market via two propagation channels. A decline in property valuations could cause leverage ratios to further increase. This could lead some non-bank CRE investors to breach thresholds (as specified in loan covenants or used by credit rating agencies in their assessments), potentially resulting in forced

deleveraging. Investors' concerns around leverage could also spur outflows from property funds, thereby exposing liquidity mismatches, or lead to sales of REIT shares. Furthermore, as leveraged REITs and property funds need to roll over their maturing debt, they tend to be exposed to a sudden increase in funding costs. An inability to increase income (say, by raising rents in the short-term) to meet higher interest repayments could also lead to forced deleveraging. A lack of information on the maturity profiles of non-bank CRE investors' borrowings, especially beyond one year, complicates a full assessment of this vulnerability.

Third, there is inherent opacity in valuations of CRE assets. The CRE market is illiquid and, as a consequence, it may be difficult to price assets particularly in times of stress. Book valuations for assets and collateral disclosed by market participants (both banks and non-banks) may recognise losses with delay, and losses may therefore emerge abruptly in a prolonged downturn. Further, the delay in loss recognition due to infrequent valuations and lenders' "extend and pretend" loan modification practices could act as an amplifier. Where investors rely on valuations based on a few recent transactions, this can also lead to procyclicality. Ways to mitigate the impact of valuation uncertainty – such as through greater transparency or by ensuring that non-bank CRE investors take account of this uncertainty in their risk management – could be considered.

The report also highlights a fourth broader vulnerability given the range of interlinkages between banks and non-bank CRE investors, which are complex and difficult to capture. Banks are the main debt providers to REITs and property funds via term loans and credit lines (off-balance sheet commitments). Banks can also invest in these funds and trusts, and they may have common asset exposures (e.g. via holdings or financing of property developers or holdings of securitised CRE assets). Shocks to the CRE market could spill over to the banking sector, thereby highlighting the importance of monitoring banks' lending to non-bank CRE investors in addition to banks' own CRE loan portfolio.

So far, the global financial system has weathered the recent adverse developments in the CRE market. A number of factors may have contributed to this benign outcome, such as: (i) the fact that poor CRE performance was limited to specific segments, with heterogeneity across and within segments (e.g. prime office property was typically less impacted), and jurisdictions; (ii) loan-to-value levels appear to be lower than during previous periods of stress; and (iii) credit to some distressed borrowers has been refinanced. However, ongoing monitoring of the CRE market is warranted, given the more volatile performance of CRE exposures compared to other assets and various developments that could impact this market and hence its financing. These developments include continued structural declines in demand for office and retail segments, as well as any adverse effects from extreme weather events or, for some segments and jurisdictions, new energy efficiency standards.

Introduction

The CRE market has experienced significant stress in recent years. Over 2022 and 2023, interest rates rose significantly in a number of advanced economies following a decade where rates had remained at historically low levels. This raised concerns about banks' exposures to CRE.[1] While large banks appear to have limited exposures, regional banks in some jurisdictions were more exposed to CRE relative to their size and in riskier segments of the market.[2]

The recent FSB report on the confluence of interest rate and liquidity risks in the financial system also identified a range of non-banks as being vulnerable to higher rates.[3] The report identified several entity types as having a high proportion of interest rate sensitive assets and liabilities,[4] including a group of non-bank CRE investors that comprises real estate investment trusts (REITs), property funds,[5] and other non-bank mortgage lenders (a subset of finance companies).

The importance of monitoring the CRE market goes beyond current developments, as it is a cyclical market that is important to the economy and the stability of the financial system.[6] Shocks to the global CRE market may propagate across the global financial system and act upon or be amplified by vulnerabilities in non-banks. Indeed, there has been a recent rising trend of non-bank investors operating in the CRE market, as banks seek to limit their risk appetite.[7]

This report assesses vulnerabilities in the non-bank investors that intermediate CRE assets in the form of debt and equity, hold them on balance sheet, or provide financing to those that do (i.e. property owners and developers). Section 1 presents an overview of CRE markets around the world, focusing on definition, the size of the markets, and the underlying performance of CRE fundamentals in recent years. Section 2 covers the known exposures by market participants and discusses linkages between them, including a conceptual map of financial institutions' involvement in the CRE market. Section 3 discusses the vulnerabilities associated across the main non-bank investors, primarily looking at the delayed CRE losses, and at funding and liquidity related vulnerabilities. Section 4 discusses the data gaps impeding the monitoring of financial institutions' exposure to this market and related vulnerabilities. Section 5 concludes and outlines a number of policy implications from the work.

---

1 See FSB (2023), *Promoting Global Financial Stability 2023 FSB Annual Report*, October.

2 See Box 1 in Bank of Japan (2023), *Financial System Report*, October and Federal Reserve Bank of St Louis (2024) *Recent Trends in Banks' Commercial Real Estate Exposure*, July and IMF (2024) *Financial Stability Risks from Commercial Real Estate*, July.

3 See FSB (2024), *Depositor Behaviour and Interest Rate and Liquidity Risks in the Financial System: Lessons from the March 2023 banking turmoil*, October.

4 The analysis also identified life insurers and a weak tail of banks as other types of entities being vulnerable to interest rate and liquidity risks.

5 Also referred to as "real estate investment funds" in some jurisdictions.

6 See Kara and Vojtech (2017), *Bank failures, capital buffers and exposure to the housing market bubble*, April and Doolittle et al. (2024) *Bank Health and Future Commercial Real Estate Losses*, July.

7 See AFIRE (2024), *Favourable Conditions: Structural Changes to the Market Favour Nonbank CRE lenders,* September.

1. Overview and recent developments of CRE markets

1.1. Definition

While there is no global common definition of CRE, some FSB members have adopted broadly similar definitions. Indeed, there has been some discussion of and efforts to harmonise definitions of CRE for at least the formation of monitoring indicators.[8] CRE is identified via reference to two key characteristics: i) the property is income generating or used for business; and ii) it is of immovable nature.

A further distinction typically applied is differentiation by segment. The common segments are office, retail, industrial and multi-family. Properties can be multi or single tenant. Commercial data providers and credit rating agencies adopt a broadly similar definition[9] and use similar breakdowns, in some cases further characterising hotels, self-storage and healthcare. There is also a segmentation associated with the quality of properties typically by 'class'[10] and/or whether it is prime or secondary grade. Table 1 below captures some of the distinctive characteristics of each segment.

Table 1: Common CRE segments

Segment	Distinctive characteristics
Office	• Described as general-use properties designed for business operations (e.g. financial services, education, management or other professional services).
Retail	• Ranges from shopping malls populated by big box retailers to standalone neighbourhood shops.
Multi-family	• Refers to a single property housing multiple families for the purpose of generating income. Typically, at least 4-5 units within a building. • Variation in type of buildings ranging from "garden-style" low rise apartments to high rise buildings.
Industrial & logistics	• Properties intended for industrial operations and used for manufacturing, storage and distribution, among other uses (e.g. data centres). • Industrial buildings are generally low-rise and can include a certain square footage of office space, or, in the case of business parks, a certain number of office buildings.
Other	• Includes hotels, healthcare, land, self-storage, non-competitive (e.g. schools or other government buildings).

8 See Mehrhoff (2017), *What is 'commercial property'?, May* and ESRB (2019), *Recommendation of the European systemic Risk Board of 21 March 2019 amending Recommendation ESRB/2016/14 on closing real estate data gaps* (ESRB/2019/3), August.

9 See *Moody's Types of Commercial Real Estate* and MSCI (2024), *Real Estate Market Size*, July.

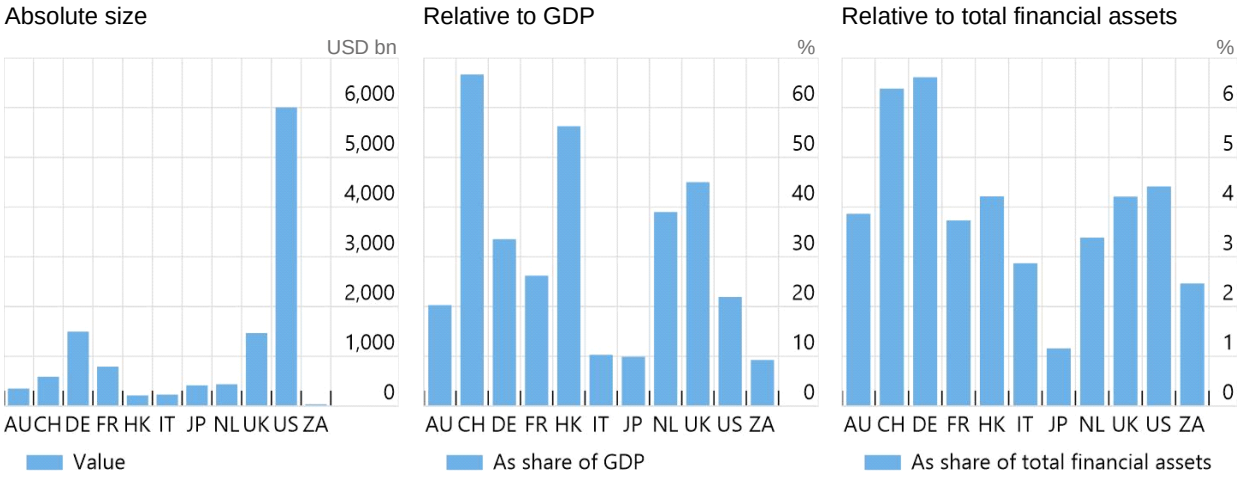
10 Class A, B, C properties, where Class A tends to be located in the most sought-after areas and modern buildings and Class C would be at the lowest end of the scale with old buildings in less desirable locations.

1.2. Size of the market

It is inherently difficult to estimate the size of the CRE market owing to limited data availability. Based on the data collated by FSB members that participated in the analysis, total CRE financing (both equity and debt) across jurisdictions is estimated to be at least $12 trillion.[11] This compares to around $10-12 trillion of market estimates, based on valuation and financials of the underlying properties.[12]

Members' data indicates that total CRE financing (referred subsequently as the CRE market) is largest in the United States in absolute terms at $6 trillion, followed by the United Kingdom and Germany with around $1.5 trillion each. The CRE market is a sizeable share of most economies, representing in aggregate 24% of jurisdictions' GDP and 4.1% of total financial assets in the jurisdictions displayed on Graph 1.

Size of CRE market in 2023 **Graph 1**



Source: FSB.

1.3. Recent developments in the CRE market

In 2023, aggregate CRE prices fell sharply across many jurisdictions, particularly the United States and the euro area (Graph 2).[13] This coincided with the interest rate cycle in advanced economies, which peaked in 2023.[14] Aggregate prices in Japan and Türkiye[15] saw growth, while prices in Spain remained flat.

---

11 Based on information provided by those jurisdictions that participated in the analysis (Australia, France, Germany, Hong Kong, Italy, Japan, Netherlands, South Africa, Spain, Switzerland, United Kingdom, United States) as well as by the ECB, ESMA, and the IAIS.

12 See MSCI (2024) *Real Estate Market Size*, July. However, this is only for CRE investments held in "professionally managed portfolio, … held in insurance and pension funds, sovereign wealth funds, listed property companies including REITs, unlisted pooled funds, charitable trusts, traditional landed estates, and by other large private property owners." Other estimates point towards a larger global market of $51 trillion; see Savills (2023), *Total Value of Global Real Estate: Property remains the world's biggest store of wealth*, September.

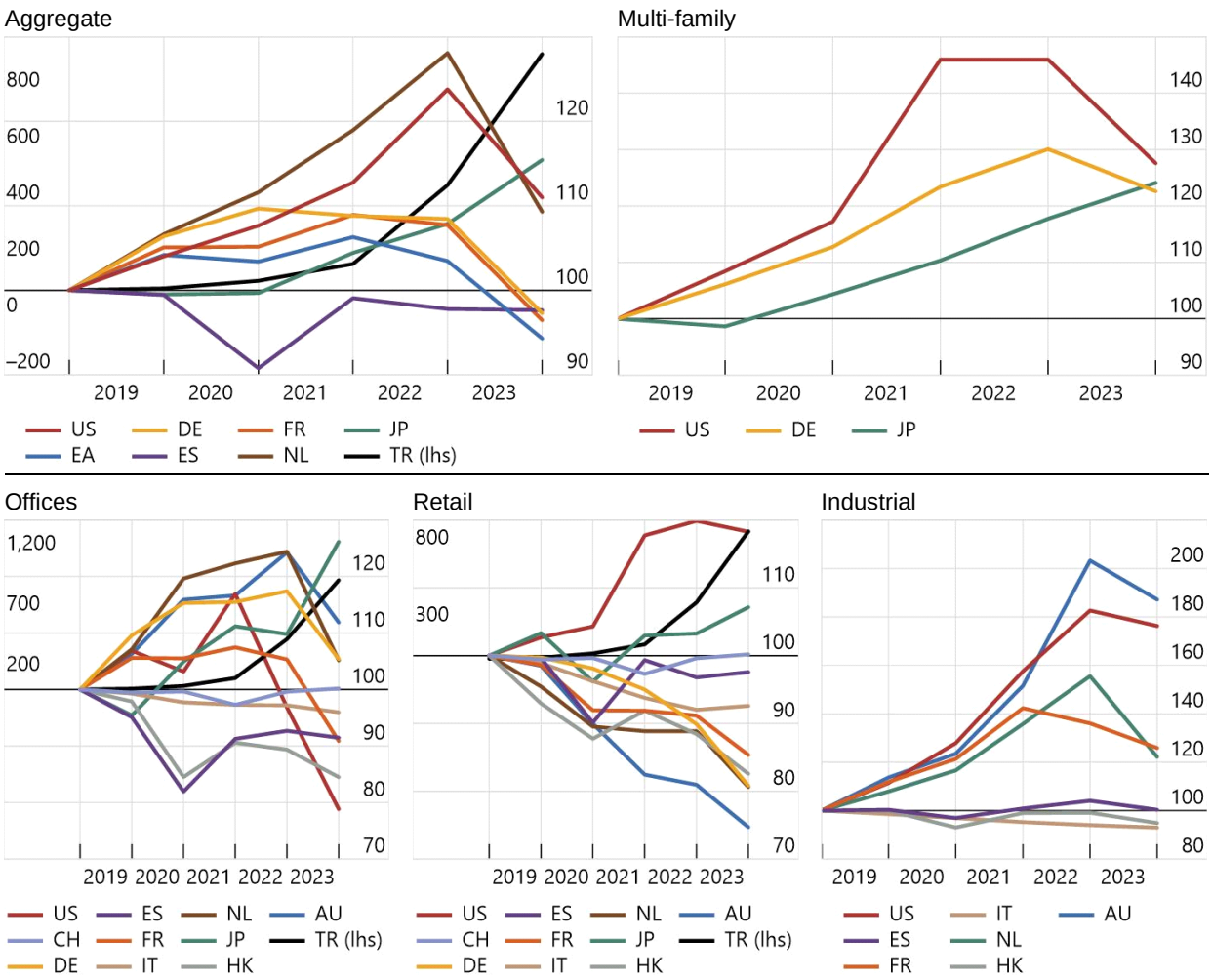
13 The data covers the period until end 2023, although some indicators in some jurisdictions may have a lag.

14 Some studies show macroeconomic factors significantly impact CRE alongside sector specific developments, for example see Espic (2025), *Commercial real estate in the euro area: macroeconomic or idiosyncratic shocks?*, March.

15 The trends for Türkiye coincide with the high inflation taking place since November 2021.

Commercial property prices, changes since 2018

2018 = 100 **Graph 2**



Notes: The trends for TR coincide with the high inflation taking place since November 2021 and is displayed on the left axis for some panels.
Source: FSB member submissions; JLL Research.

For the United States and the euro area, much of the decline came from the office segment, with some jurisdictions experiencing a shock even earlier, during the COVID-19 pandemic. The retail segment also saw prices decline across the euro area, Australia, and Hong Kong, at least since 2019. In contrast, the United States, Japan, and Türkiye saw continued growth until 2022. The multi-family segment experienced a sharp rise in prices in the year after the pandemic but in 2023 prices have started to fall in Germany and the United States. The industrial segment experienced somewhat different dynamics, in that 2023 does not seem to mark a clear watershed; also, price growth was strong in some jurisdictions since 2019, whereas in others it was flat. The COVID-19 pandemic appears to have affected only certain CRE segments but did not have a strong impact on aggregate CRE markets (see Box 1).

Box 1: The effect of the pandemic on the CRE market

The unprecedented policy measures taken by governments and central banks to cushion the economic impact of the pandemic are likely to have helped the CRE market during the pandemic through direct measures (such as tax relief for landlords, forbearance of commercial mortgage payments), as well as through indirect support (such as cash grants or transfers and tax credits to tenants, e.g. for severely affected retail and hospitality businesses). However, the pandemic is likely affecting some segments of the CRE market through structural changes.

The office segment continues to face challenges due to the widespread increase in home working, which has become permanent in many jurisdictions (2-3 days a week working from home is now common).[16] This has led to a reduction in demand for office space, albeit the pattern is heterogeneous across jurisdictions and, according to engagement with private stakeholders, also across regions. For example, some stakeholders referred to offices in larger and well-connected cities faring better than smaller cities.

The retail segment was also affected by the lockdowns as a result of the pandemic, although this segment has also been negatively influenced by the broader shift to e-commerce over the last decade.[17] The outlook varies by subsegment. While high street stores, especially in central business districts, and shopping malls face pressures, stores which cater to specific needs continue to thrive (such as fitness centres and beauty supply stores as well as stores located in tourist areas).[18] The hospitality segment also appears to have benefitted from pent up demand for travel following the pandemic.

The multi-family segment appeared to be well insulated during the pandemic. Government stimulus helped renters pay rent either through direct support or indirect support to manage unemployment in the broader economy. Furthermore, the impact of lockdowns saw a behavioural shift to larger properties with access to outdoor space (a similar trend to that of for residential properties).

The industrial and logistics segment saw a boom during the pandemic as the surge in e-commerce increased demand for warehouses and fulfilment centres as businesses sought additional space to store inventory and manage their distribution network to meet this growing demand. In addition, the sudden disruption of logistics chains during the pandemic set incentives for near shoring and further fuelled this demand.[19]

The global transaction volume of acquisitions of income-producing real estate fell 48% from 2022 (see Graph 3). Market estimates also show a decline in the ratio of transaction volume to market size. The global average ratio was 4.0% for 2023 as compared to 8.7% for 2022. This reduction in sales volumes, coinciding with higher interest rates, may indicate lower liquidity in the segment. Engagement with private stakeholders also highlighted the significant slowdown of transactions as hampering market analysis and valuations.

16 See PIMCO (2024), *Facing the Music: Challenges and Opportunities in Today's Commercial Real Estate Market*, July.

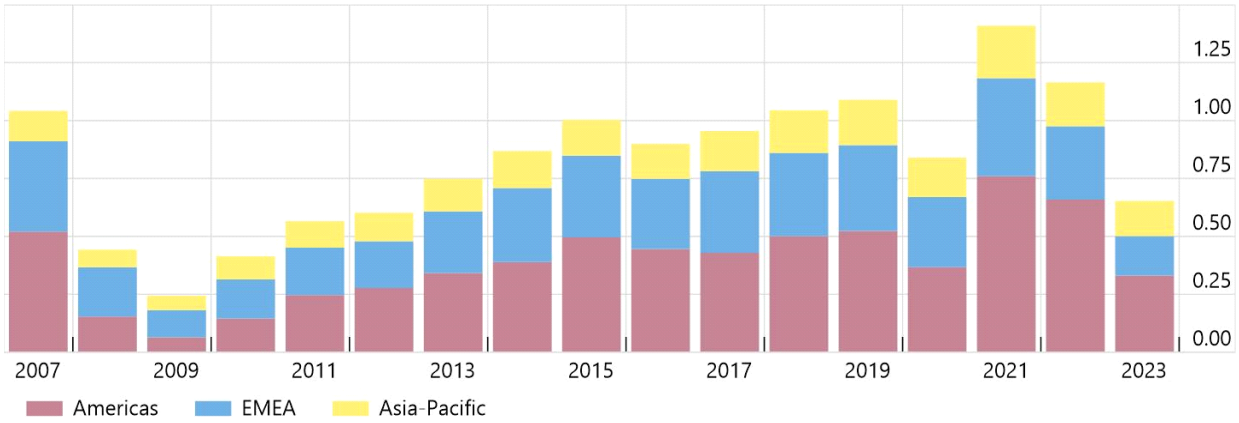
17 See RBA (2023), *Financial Stability Risks from Commercial Real Estate*, September.

18 See Moody's (2024), *Adapting to Change: The Evolving Landscape of Retail Leasing*, August.

19 See, for example, JLL (2020), *COVID-19: Global Real Estate Implications*, April and DAA Capital Partners (2020), *Logistics real estate amid the COVID-19 outbreak*, May.

Global volume of transactions in the CRE market

In USD trillions **Graph 3**

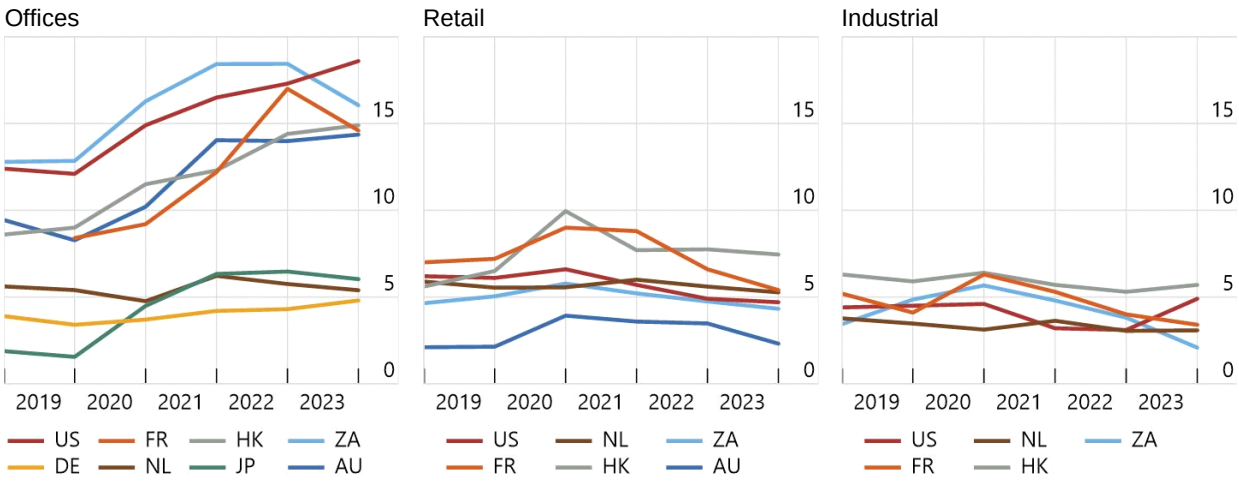


Source: MSCI (2024), Real Estate Market Size, July.

Vacancy rates,[20] as a proxy for demand, suggest that demand for office space has decreased significantly in several jurisdictions since the pandemic (Graph 4). In contrast, the industrial segment experienced a relatively stable and stronger demand, while demand for retail seems to have stabilised after the pandemic and the earlier onset structural decline, with both segments displaying vacancy rates around 5% or lower for most jurisdictions at the end point.

Vacancy rates

In per cent **Graph 4**



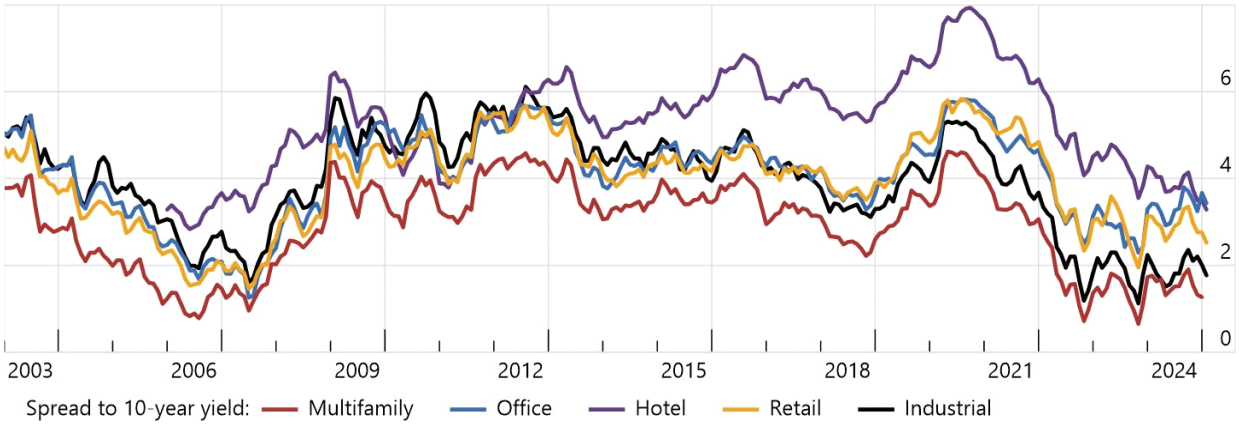
Sources: FSB member submissions; JLL Research.

Capitalisation rates measure the implied return demanded by purchasers. Factors such as valuation adjustments and interest rates, which affect the cost of capital, have an impact on capitalisation rates. Relative to long-term interest rates, capitalisation rates peaked for many sectors across 2019-2020 and have since fallen though remain positive (Graph 5).

[20] Typically referred to as the number of days a CRE unit has remained vacant relative to days available for lease. Another measure available is the economic vacancy rate which is the difference between the actual rental income and the gross potential rent of a property, for example see Rocket Mortgages (2024), *What Is A Vacancy Rate And How Is It Calculated?*, March.

U.S. CRE capitalisation rates spread to 10-year nominal yield

In per cent **Graph 5**



Sources: Federal Reserve Bank of St. Louis, *FRED*; Bloomberg; RCA; FSB calculations.

2. CRE market participants and their interconnectedness

Exposures to the CRE market (in the form of debt and equity) are heterogeneous both across jurisdictions as well as intermediaries (Graph 6). As will be explained in Section 4, data gaps preclude a full overview of all financial institutions participating in the CRE market. However, the main categories have been identified at least conceptually. Banks are estimated to have the majority of exposure across most jurisdictions, around $8.5 trillion overall. Graph 7, displaying the share of CRE exposure held per entity type, suggests that a range of non-banks have exposure to the CRE market. These non-bank CRE investors, as described below, offer more financing options for borrowers and reduce dependency on bank financing, which can be beneficial for overall financial stability.

- REITs, which are close-ended investment vehicles that can be either publicly listed or private/unlisted (both covered by the data collection). REITs primarily investing in equity (eREITs) are the most common type, but there are so-called "mortgage REITs" in some jurisdictions (see below). REITs are subject to minimum pay-out ratios in order to gain preferential tax status;[21]
- property funds, which can be open-ended or closed-ended;
- finance companies, understood as other non-bank mortgage lenders;
- structured finance vehicles issuing CRE securitised assets may also hold CRE loans;
- insurers;
- pension funds; and

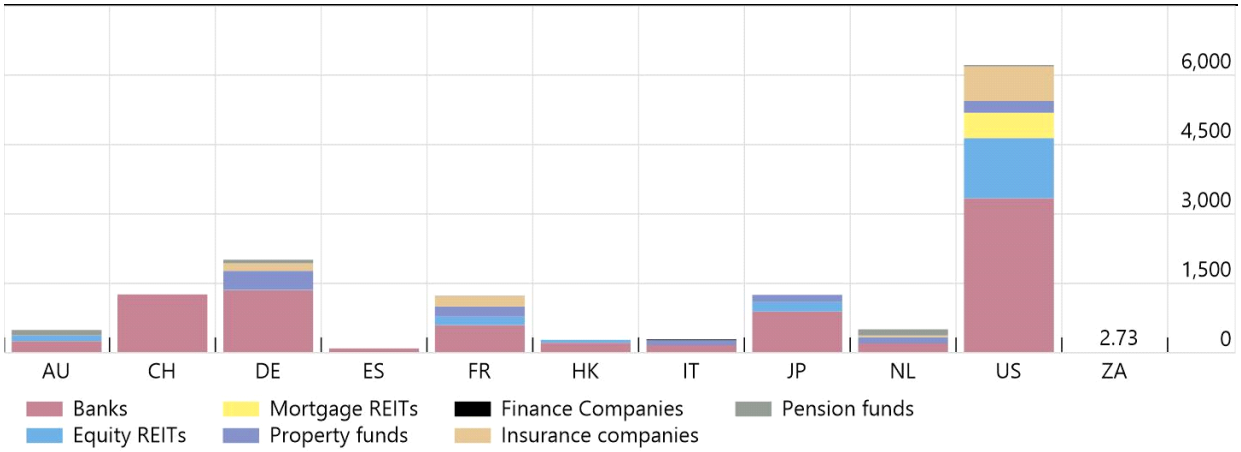
[21] Given REITs are defined as a specific "tax status" vehicle, they overlap with the category of finance companies or funds.

- private funds[22] (which may or may not be specialised in CRE) as well as hedge funds, family offices, high-net worth individuals and endowments funds, though data gaps limit insights into the extent of their CRE exposure.

Graphs 6 and 7 suggest that property funds are mostly found in the European Union, the United Kingdom, and South Africa. REITs are mostly found in Hong-Kong, Japan, and the United States.[23] However, these graphs should be interpreted carefully given data gaps, especially for non-bank entities. As a result, the share of banks in CRE may be overestimated.[24]

CRE known exposure by entity types, absolute amounts in 2023

In USD billions **Graph 6**



Notes: The graph attempted to gather all types of exposures to the CRE markets (ownerships, funding to property developers, investments in CMBS, etc.), however and given data gaps, the graph is based on jurisdictions' own definitions of CRE exposures from their existing data collection. In several jurisdictions, there have also been attempts at estimating the size of the market by gathering private and public sources and conducting surveys with industry. Property funds are only domestic funds. Exposures were reported at the entity level and include exposures through funds and trusts, which may therefore imply some double-counting (e.g. institutional investors may hold REIT shares).

Sources: FSB member submissions.

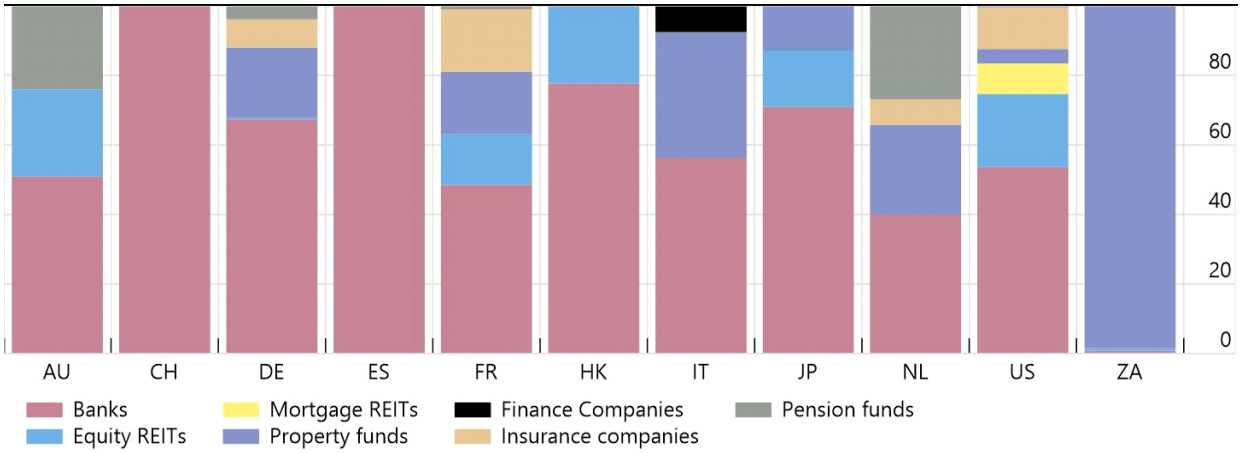
22 Private funds are collective investment vehicles that are not publicly offering their securities and are typically privately placed to non-retail investors. Some jurisdictions have reported that while private funds have to report their holdings of CRE physical assets and securitised products, they do not report CRE loans.

23 This is a simplification as, for example, REITs can be found in France and property funds can be found in Japan.

24 This can be illustrated by the extent to which investors fund themselves in the United Kingdom, where market-based funding (including bond issuance) is in fact as large as UK bank funding. See Bank of England (2023), *Financial Stability Report*, July.

CRE known exposure by entity types, relative amounts, 2023

In per cent of total known exposure **Graph 7**



Notes: See Graph 6.

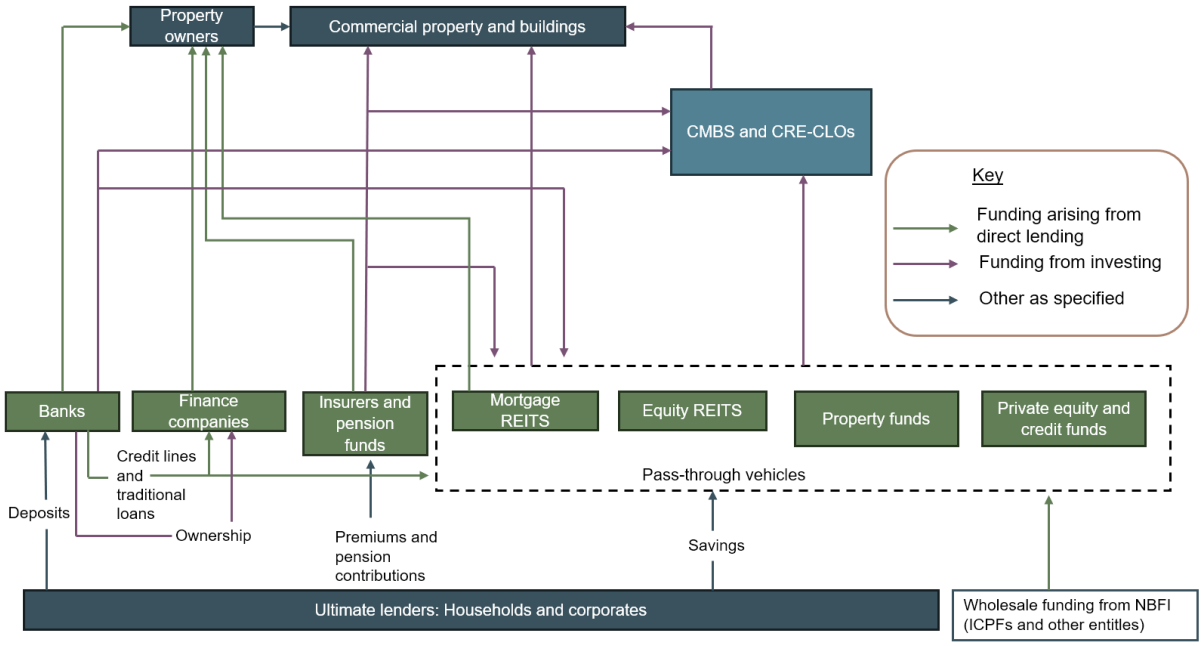
Sources: FSB member submissions.

Both banks and non-banks can also have indirect exposures to CRE via holdings of property funds and REITs or via CRE-securitised assets, forming complex intermediation chains summarised in Figure 1. This map attempts to illustrate the different types of exposures (equity and debt) and interconnectedness across the financial system. It was not possible to estimate the size of the linkages given data gaps.[25]

[25] Some FSB members have found similar issues in their domestic analysis and also attempted to understand specific areas of interconnectedness. For example, see Daly et al. (2024), *Mapping the maze: a system-wide analysis of commercial real estate exposures and risks*, ECB Macroprudential Bulletin 25, November.

Simplified schematic of CRE financing

Figure 1



Source: FSB.

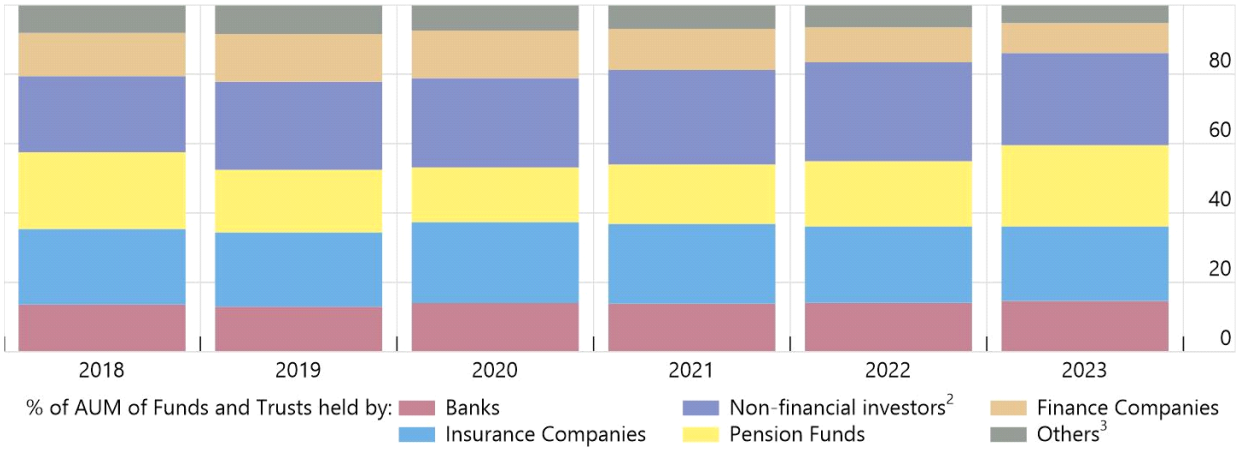
Note: The property owners refer to "third-party" property owners as the schematic also indicates non-bank CRE investors such as REITs and property funds can also be property owners in CRE.

Conceptually, one can identify a range of pass-through vehicles investing in the CRE market: eREITs and mREITs, property funds (which can be open-ended or closed-ended), and private funds. The holders of units in these vehicles will take on the CRE market risk. The vehicles invest in and own physical properties, and their revenues therefore come principally from their properties' rents. mREITs can also act as lenders within the CRE market. They do not invest in physical real estate but derive most of their income from investing, owning or originating debt instruments, such as commercial property mortgages or mortgage-backed securities. Earnings are generated through the interest on the loan as mREITs do not directly own or manage properties.

Graph 8 shows the investors in property funds and REITs that could be identified in some FSB jurisdictions. While institutional investors (insurers, pension funds, and banks) hold a sizeable share of the vehicles' units, it is actually the non-financial private sector (mostly the retail and non-financial corporation sectors) who is the largest single investor type.

Investor share in funds and trusts[1]

In per cent **Graph 8**



[1] DE, ESMA, FR, IT, JP, NL, UK, and ZA. [2] Non-financial corporations and households. [3] Other funds and trusts and other financial institutions.

Sources: FSB member submissions.

Cross-border linkages remain one of the most important data gaps. FSB member analysis suggests that investment vehicles such as property funds and REITs may have a relatively more important exposure to foreign CRE than other entity types. Data available for Germany and the United Kingdom suggest a significant amount of exposure of property funds to CRE located abroad, in some cases more than 20% of total assets under management. Similarly, foreign participation in Australia's CRE market and in Japanese REITs is also noticeable.[26]

There is limited information on the specific activities of private funds though they are presumed to invest in real estate directly and possibly to a lesser extent in CMBS and via securities and shares issued by real estate companies, REITs, and property funds. Reports suggest that capital raised by closed-end private real estate funds since 2019 is significantly growing[27] – and engagement with private stakeholders suggest that private funds may focus on the riskier CRE segments.

Commercial mortgage-backed securities (CMBS) are another source of exposure to the CRE market. Structured finance vehicles purchase commercial mortgages from different lenders (mostly from banks) but also finance companies, pool them, and issue securities backed by that pool of mortgages. The tranches of CMBS are then sold onto a range of bank and non-bank investors. Box 2 provides an overview of the CMBS market including its evolution since the financial crisis.

The main CRE exposures for commercial banks tend to be loans to owners of CRE properties (including property developers). As the large majority of these loans are backed by the underlying CRE collateral, banks bear – as usual with real estate lending – the credit risk of the borrower and the valuation risk of the underlying CRE portfolio in case of borrower default

[26] See RBA (2024), *Financial Stability Review September 2024*, September, and Hogen and Koide (2022), *Flows of Overseas Funds in the Real Estate Market*, 2022 who state that "Japan's real estate fund market has also experienced inflows from foreign investment funds, which now hold a share equivalent to almost 20 percent of the total market value of J-REITs".

[27] Apollo Global Asset Management (2024).

(although loan-to-value limits are typically used to mitigate this risk). The credit risk of the borrower also includes refinancing risk in the event of rising interest rates. Banks also provide financing to non-bank investors, see Section 3.5 for further discussion on interlinkages and spillovers to the banking sector from vulnerabilities in non-bank CRE investors.

Finance companies – sometimes part of banking groups – offer bank-like services in the form of loans to property owners and therefore face risks similar to those borne by banks,[28] but they are not necessarily subject to an equivalent prudential regime.

Insurers and pension funds hold CRE assets, CMBS and shares of pass-through vehicles (REITs and property funds) as part of their broader asset management operations. Some may also offer financing to property owners, typically as part of market-based financing the property owners seek to receive.[29]

Box 2: Overview of the CMBS market

CMBS refers to mortgage-backed securities where the underlying mortgages are written on commercial properties. Typically, the issuer of a CMBS purchases loans from banks and finance companies and securitises them. The typical CMBS deal is backed by a portfolio of properties. However, another type available is single asset/single borrower whereby the CMBS is based on one property or one borrower with multiple properties. The underlying loans offered to the end borrowers are typically a mix of single borrower loans, which are non-amortising and have a tenure of 5-10 years, and conduit loans which are typically amortising over 20-30 years and include a fixed rate up to 10 years.[30]

A CMBS is in the form of bonds organised by tranches, which vary by level of credit risk. The senior tranches offer the lowest level of risk whereas the junior tranches are the highest risk and are first to absorb losses. The payments of CMBS follow a cashflow waterfall, whereby the senior tranches receive principal and interest payments first but at the lowest yield relative to the higher risk tranches. The waterfall also specifies how loan prepayment penalties, loss recoveries and other cash received are allocated throughout the CMBS structure. Some CMBS deals are agency backed where there is a government guarantee. CMBS can offer flexibility for the borrower, and sometimes offer higher LTV ratios than other lenders. However, CMBS loans usually come with prepayment penalties.

The CMBS market is largest in the United States and estimated to be around $636 billion as of Q2 2024, stable since 2023 and the highest such nominal value since 2011 (Table A).[31] The market is significantly smaller in Europe at around €29 billion as of 2024 Q3, slightly lower compared to previous years. CMBS tends to be focussed on office and retail segments, which represent around 45% of the market composition in US CMBS deals.

CRE loans may also be securitised in collateral debt obligations (CLOs). These CRE CLOs differ from CMBS as they collateralise shorter-term, transitional financing. The market is estimated to be around $75 billion as of April 2024.[32]

---

28 Though finance companies do not have access to central bank facilities which might help banks manage the credit risk as some CRE may qualify to be pledged.

29 See IAIS (2024), *Global Insurance Market Report*, December provides some data on insurers' exposure to CRE.

30 See DoubleLine (2023), *Introduction to Commercial Mortgage-Backed Securities*, March; Trepp (2022), *CMBS 101: Trepp's Essential Guide to Commercial Mortgage-Backed Securities*, March; and CMBS Loans (2022), *What is a conduit loan?*, March.

31 In 2011, *SIFMA* estimates the US CMBS market outstanding size of $670 billion.

32 See CrediQ (2024), *Nearly 40% of CRE CLO Loans are on the Watchlist*, May.

Table A:Non-agency CMBS Market outstanding in billions

	2024	2023	2022	2021	2020	2019
US (USD)	636	636	648	571	551	498
EU (EUR)	29	33	35	35	31	33

Source: Mortgage Bankers Association (2024), AFME (2024)

CMBS bonds are more resilient compared to pre-GFC structures (vintages 2000-2008). The average loan-to-value for post GFC vintages (2010 to 2022) is lower alongside higher debt servicing ratios and thicker subordination tranches (See Table B). These changes are part of a broader set of enhancements to securitisation including the introduction of a 5% minimum risk retention requirement,[33] conservative changes to the ratings criteria by rating agencies, and tighter underwriting standards for the underlying loans by loan originators.

Table B – Key changes in CMBS structures

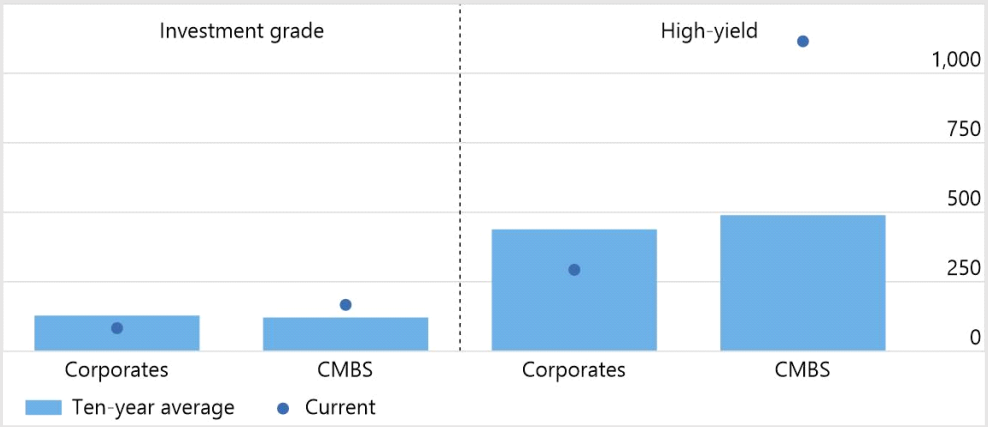
CMBS metrics	CMBS pre-GFC	CMBS post-GFC
Loan-to-value	70.0%	52.8%
Debt Service Cost Ratio	1.4x	2.6x
AAA Credit enhancement	12.0%	19.5%
Average cumulative loss	7.2%	0.6%

Source: Doubleline, BoA Global Research (2023).

The stress in the CRE market is putting pressure on the CMBS market. Spreads are elevated relative to their historical average (Graph A1). This holds across higher and lower grade tranches, reflecting investors' uncertainty about the wider market. Similarly, the special service rate[34] reached 8.8% (up from 6.9% last year) as of September 2024.[35] Distress was evident in multiple segments with office and retail segments having the highest rate at 12.6% and 11.2% respectively, as of September 2024. Similar rising trends have also been observed in CRE CLOs.[36] Further, across securitised real estate loans, loan modification rates doubled that of 2024.[37] Some private stakeholders, who were contacted during the work, expected continued growth in CMBS issuance with strong investor demand for CMBS bonds and particularly those with green characteristics. However, they advised caution due to projections of elevated 10-year rates and risk premia for CMBS and cap rate spreads.

Spreads of CMBS across several ratings are elevated, reflecting the uncertainty in CRE among investors[1]

In basis points **Graph A1**



IG = Investment Grade, HY = High Yield. [1] As of 23 October 2024.
Source: ICE BofA, LSEG; FSB.

3. Vulnerabilities across non-bank CRE investors

Given existing data gaps, the analysis of vulnerabilities focuses on property funds and REITs. Three main vulnerabilities – which may interact with each other – were identified in these non-bank CRE investors:

(i) a mismatch between portfolio liquidity and redemption frequency for some open-ended property funds, as well as potentially for unlisted REITs;[38]

(ii) pockets of highly leveraged REITs and property funds, including refinancing needs linked to the use of leverage; and

(iii) valuation uncertainty and delays in recognising losses in non-bank CRE investors' balance sheets.

Alongside these three vulnerabilities, losses in non-bank CRE investors and in the CRE market could spill over to banks via a range of complex interlinkages, which form a fourth vulnerability.[39]

3.1. Liquidity mismatches

Property funds

Liquidity transformation is known to take place in open-ended property funds, which invest in illiquid assets by nature – properties can take at least several months to be sold, especially in a downturn – and they might offer investors the possibility to redeem their shares on shorter notice, even on a daily or monthly basis. This mismatch can create a first mover advantage and cause fund investors to run. In such a scenario, funds may need to liquidate more assets than expected, which can produce spillovers to the wider CRE market.

Data collected from FSB member jurisdictions suggest that open-ended property funds are mostly located in the Netherlands, Germany, and the United Kingdom, where they hold 68%, 87%, and 66% of assets under management (AUM) of all property funds respectively (Graph 9, left panel). A non-negligible proportion of open-ended property funds in some jurisdictions allow for daily or monthly dealings (Graph 9, right panel).

---

33 See IOSCO (2012), *Global Developments in Securitisation Regulation*, November.

34 The percentage of securitised CRE loans that are in the hands of a special servicer, usually because of doubts about the borrowers' ability to repay the debt on time.

35 See Trepp (2024), *CMBS Special Servicing Report September 2024*, October.

36 See CrediQ (2024), *Distress Rate Hits All-time High of 13.1% for CRE CLOs*, October.

37 See CrediQ (2025), *Extend & Pretend Trend – Modifications Double within 12 Months*, January.

38 Liquidity transformation may also happen in mREITs. mREITs primarily finance their whole-loan originations with term financing through the securitisation markets, so the prospect for disorderly deleveraging is less for these REITs. However, as CMBS market conditions have deteriorated in recent quarters, a larger share of their loan originations is awaiting securitisation and remains on secured financing lines, with the prospect for margin calls and liquidity risk.

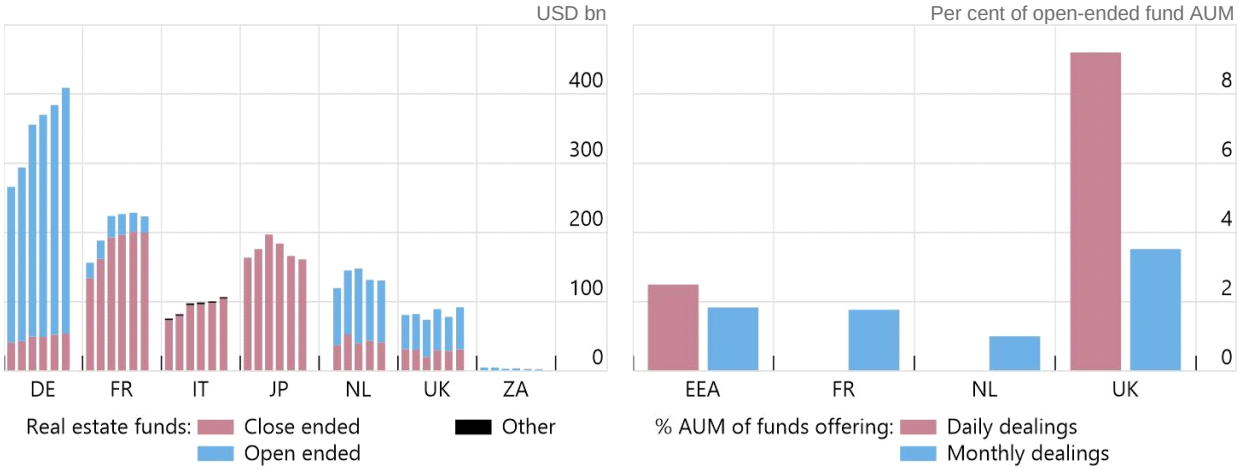
39 Interconnectedness between non-bank CRE investors also exists, but this section focuses on potential spillovers to the banking sector given its relevance for financial stability.

Share of open-ended property funds

Graph 9

Split between open-ended, close-ended, unknown funds (AUM), across 2018-2023

Dealings, end 2023



EEA stands for European Economic Area.

Source: FSB member submissions.

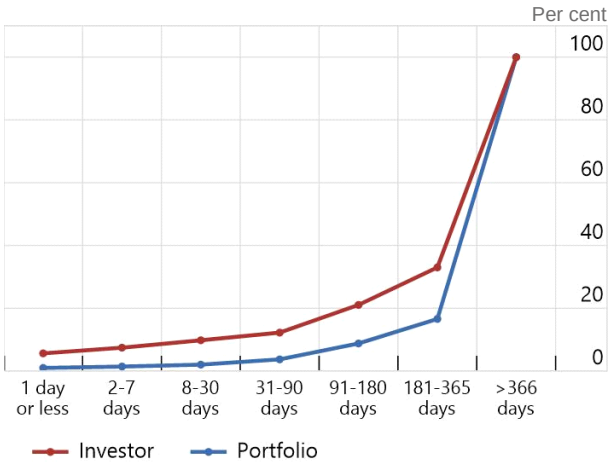
To assess the degree of liquidity transformation, one can compare the percentage of a fund's assets capable of being liquidated within a specified time-period (portfolio liquidity) with the shortest time-period over which investors can redeem (investor liquidity). Aggregate investor liquidity appears greater than aggregate portfolio liquidity in the European Union, suggesting a liquidity mismatch in some funds (Graph 10, left panel). Another way to assess liquidity transformation is to collect data on liquid assets held by property funds. UK fund data suggest that daily dealing funds hold a larger share of liquid assets in their portfolios than other open-ended funds to manage potential liquidity needs (Graph 10, right panel).[40] Further data on how cash positions are distributed across daily-dealing property funds would be helpful to better assess the vulnerability.

[40] The data do not distinguish funds that are managed "in-house" by institutional investors as part of a wider investment strategy, which may make them less susceptible to runs; or the availability of liquidity management tools to handle redemption pressures.

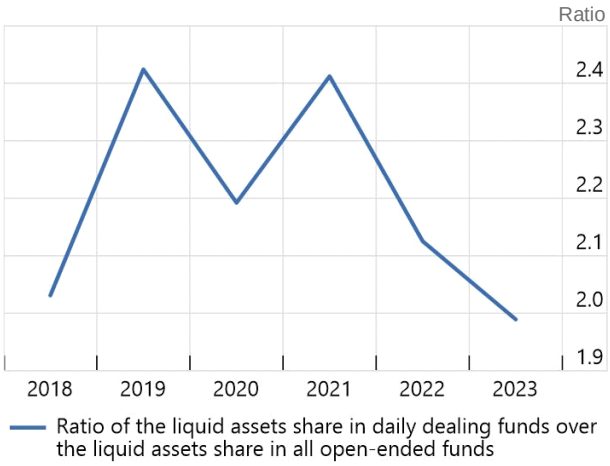
Liquidity transformation in open-ended funds

Graph 10

A. European Union[1]



B. Liquid assets held by UK property funds



[1] Portfolio and investor liquidity profiles of real estate funds managed by authorised AIFMs in the EU, in %, end of 2023. Portfolio liquidity defined as the percentage of the funds' assets capable of being liquidated within each specified period, investor liquidity defined as the shortest period for which investors can redeem. d=Days. Note that the liquidity mismatch varies across EU jurisdictions.

Sources: AIFMD database, EU national competent authorities, ESMA, FCA, FSB.

Ex-ante and ex-post tools can be adopted to manage the liquidity mismatch. For example, minimum holding periods and notice periods were introduced in Germany in 2013. Since then, investors in open-ended retail property funds are required to announce fund share redemptions twelve months in advance and are subject to a minimum holding period of 24 months.[41] Ex-post tools include redemption gates or suspensions of redemptions,[42] though these do not remedy the underlying structural liquidity mismatches. Detailed information on these tools would help authorities further assess the extent of the vulnerability.[43] Another dimension that could help in monitoring liquidity vulnerabilities is to split funds and redemption rights by CRE segment. Indeed, Section 1 has provided background on the different CRE segments and how they might follow different trends. Such data were publicly available for funds in the European Union. It shows that there are redemption frequencies on up to a monthly basis allowed for property funds investing in several CRE segments (Graph 11). This liquidity mismatch, as well as leverage, was specifically assessed by the Central Bank of Ireland, which imposed measures to increase resilience of Irish property funds – see Box 3.

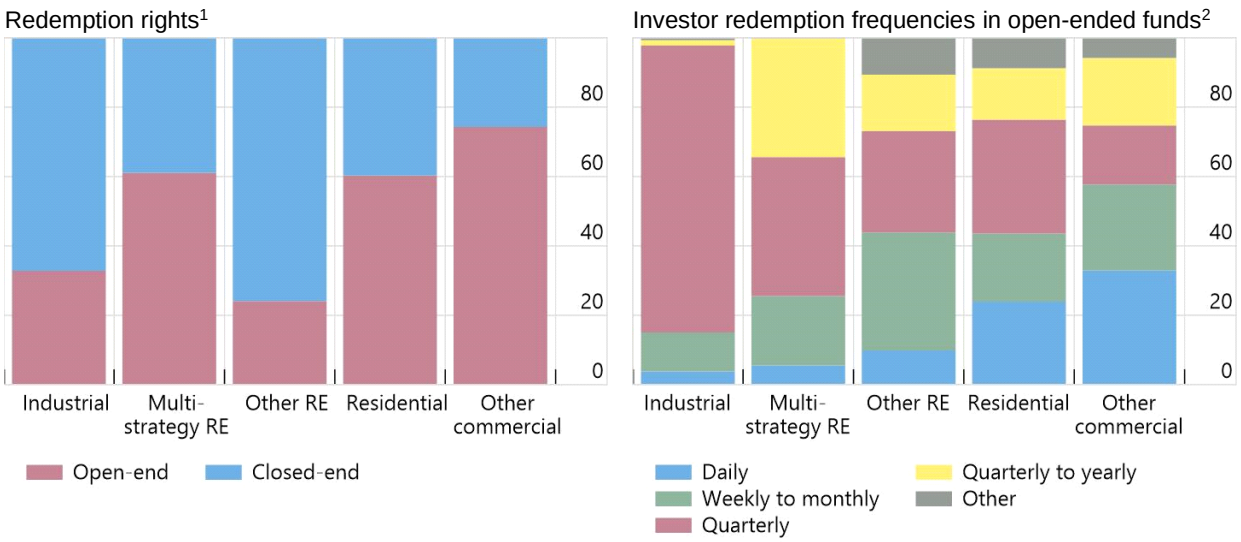
41 See Bundesbank (2024), *Financial Stability Review 2024*. Minimum holding periods and notice periods do not apply in general to open-ended specialised real estate funds. However, a BaFin survey has revealed that at end-2023 around 80% of specialised real estate funds had regulations on notice periods in place and that the agreed redemption period was usually six months.

42 For example, see Darius McQuaid (2023), *Is it the beginning of the end for property funds?*, November, and Peter McGahan (2024), *Property funds suspension – what it means*, July.

43 The FSB worked on a data pilot programme in 2024 to assess the extent of information available for open-ended funds, including information on the liability side.

Redemption rights and frequencies per property types for EU funds

In per cent **Graph 11**



[1] Redemption rights provided in the ordinary course to investors in property funds, managed and/or marketed by authorised EU AIFMs, end of 2023, in % of NAV. [2] Investor redemption frequencies allowed by open-end property funds managed and/or marketed by authorised EU AIFMs, end of 2023, in % of NAV.

Source: AIFMD database; EU member state data; ESMA.

Box 3: Vulnerabilities and macroprudential measures for the property funds sector in Ireland

In 2022 the Central Bank of Ireland (CBI) introduced a macroprudential policy framework intended to enhance the resilience of the property fund sector, given vulnerabilities related to leverage and liquidity mismatch.[44] These measures were introduced under the Alternative Investment Fund Managers' Directive (AIFMD) and apply to all Alternative Investment Funds domiciled in Ireland, authorised under domestic legislation, with 50% or more invested in Irish property assets (both directly and via subsidiary vehicles).

The main risk that the CBI's macroprudential measures seek to guard against relates to potential forced selling behaviour by the property fund sector as a whole. Property funds are a key participant of the CRE market in Ireland. This market is important for the real economy, notably through the construction sector, which is a meaningful share of Irish economic activity. Both Irish banks and non-banks participate in CRE financing.[45] Many Irish borrowers use CRE as collateral for loans (e.g. 45% of SME exposures to Irish retail banks had CRE as collateral) so a dislocation in this market could impact the financial system via a number of channels, including ability of non-financial companies to access finance.

The CBI conducted a survey among open-ended property funds in 2020 to bridge data gaps and better understand the vulnerabilities associated with this cohort.[46] These funds held CRE of €23 billion, over 40% of total invested in Irish CRE, identifying them as important for market functioning. The majority of equity investors in Irish property funds were identified to be located outside Ireland, primarily in Europe and the United States, thereby increasing vulnerabilities of these funds to global financial conditions.

Two main vulnerabilities were identified – leverage and liquidity mismatch – especially in a cohort of funds holding €5.2 billion in property assets and exhibiting both liquidity timeframes below 180 days and

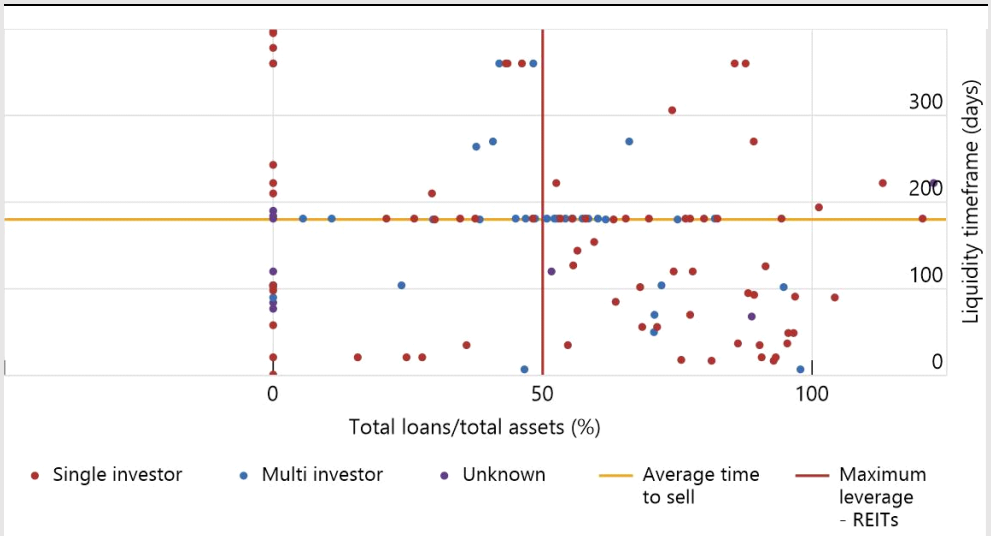
44 See CBI (2022), *The Central Bank's macroprudential policy framework for Irish property funds*, November.

45 See also Moloney et al. (2023), *Non-bank lenders to SMEs as a source of financial stability risk – a balance sheet assessment*, December.

46 See Daly et al. (2021), *Property funds and the Irish commercial real estate market*, February.

leverage (measured as total loans over total assets) above 50%, making them particularly vulnerable to external shocks (see Graph B1).

Property funds' liquidity timeframe vs loans to total assets ratio **Graph B1**



[1] Data includes 140 property funds with 20.6 billion in property asses. Information on liquidity timeframes is unavailable for 36 property funds with 2.8 billion in property assets. Information on notification and settlement periods is taken from fund prospectuses. For clarity, chart excludes 7 property funds (3 single-investor and 4 multi-investor) with liquidity timeframes over 400 days.

Sources: CBI 2020 survey, MMIF Q4 2020 and prospectus information.

Liquidity mismatch – These property funds held only 5% of liquid assets, meaning they would have to sell properties in order to meet redemptions above this amount. Selling CRE property would take approximately 200 days in normal conditions and 400 days in stressed conditions, according to fund managers surveyed and an analysis of CRE transactions. Certain segments, including retail and development property, had a significant proportion of assets that would take over 365 days to sell in normal conditions. Liquidity timeframes for property funds did not reflect this – 83% of property assets were held in funds that would have to pay out redemptions in under 400 days, 58% of which were under 200 days. In stressed conditions, this creates the risk of fire-sales.

Leverage – While Irish property funds had an average leverage of 45%, there was significant variation amongst them, with 10% of funds having leverage above 93%. A decline in CRE valuations could cause leverage to further increase and therefore funds to breach their loan covenant thresholds, which could result in forced sales of the underlying property. If forced sales create further reductions in valuations, more funds could be susceptible to breaching loan covenants, creating further market dislocation.

In view of these vulnerabilities, the CBI introduced two measures. First, leverage was capped at 60% of total debt to total assets.[47] This helped align property funds with Irish REITs, whose leverage is capped at 50%, and European peers, 90% of which have leverage below 60%. Second, liquidity timeframes of 12 months were introduced, to be balanced between a notification period from the investor wishing to redeem and the settlement period after which the investor receives redemption proceeds. This gives property funds time to sell assets to meet redemption requests, as well as reducing the incentives of first-mover advantage.

The implementation process for the leverage limit is ongoing until end-November 2027, and the CBI continues to monitor this sector, with an annual data reporting required from funds to assess the progress they are making towards compliance.

[47] Using the provisions in Article 25 of *AIFMD*.

REITs

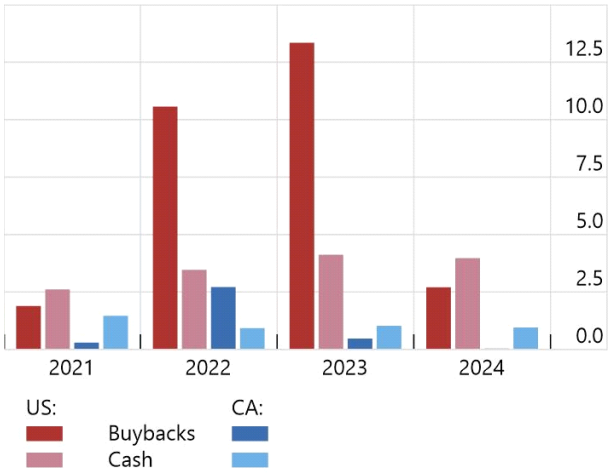
Listed REITs allow investors to sell their shares on the public exchange markets, and therefore these would typically not be subject to liquidity mismatches. Unlisted REITs, however, typically offer their investors repurchase plans on a monthly or quarterly basis. Contracts often include a predetermined period of times during which investors are not allowed to access their capital, unless against penalties, but further work would be required to understand the extent to which buybacks/repurchase offers are contractual/required or optional. In many jurisdictions, REITs need to distribute a significant share of their earnings (if not all) to shareholders via dividends in order to retain tax advantages. As a result, cash positions are typically low.

Stock buyback activity of unlisted REITs, their cash positions, and repurchase requests from stockholders could give an indication of liquidity pressures in these REITs and their investors. Data on repurchase requests were not available to assess whether these requests were met and, if so, with cash or by selling properties. However, available data (Graph 12) suggest that unlisted REIT buybacks were larger than cash positions over 2022-23, implying that they may have had to sell properties to finance these buybacks. In addition, press reports indicate that some unlisted REITs were not always able to meet repurchase requests.[48] More recently, REIT share repurchase activity seems to have picked up, reaching levels seen at the beginning of 2022 and of the rate cycle.[49] This could lead to significant discounts on the share values.

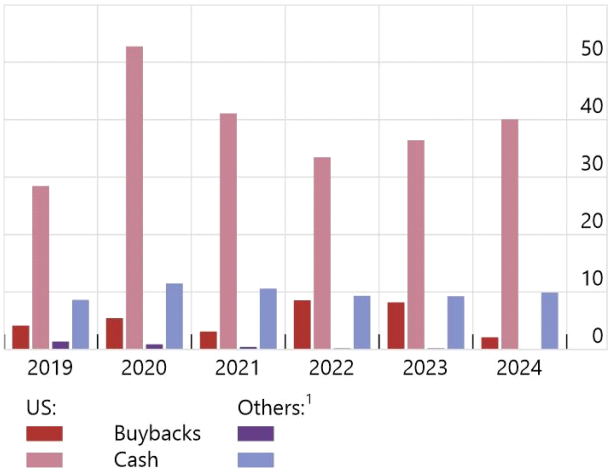
REIT share buybacks and cash positions

In USD billions **Graph 12**

1.Unlisted REITs in the United States and listed REITs in Canada



2. Listed REITs in the United States and in other jurisdictions



[1] AU, DE, ES, GB, HK, IT, JP, KR, NL, and SG.

Sources: S&P; FSB calculations.

[48] See Wall Street Journal (2023), *Blackstone's Big New Idea Leaves It Bruised*, February; and Financial Times (2024), *Starwood's $10bn property fund taps credit line as investors pull money*, May.

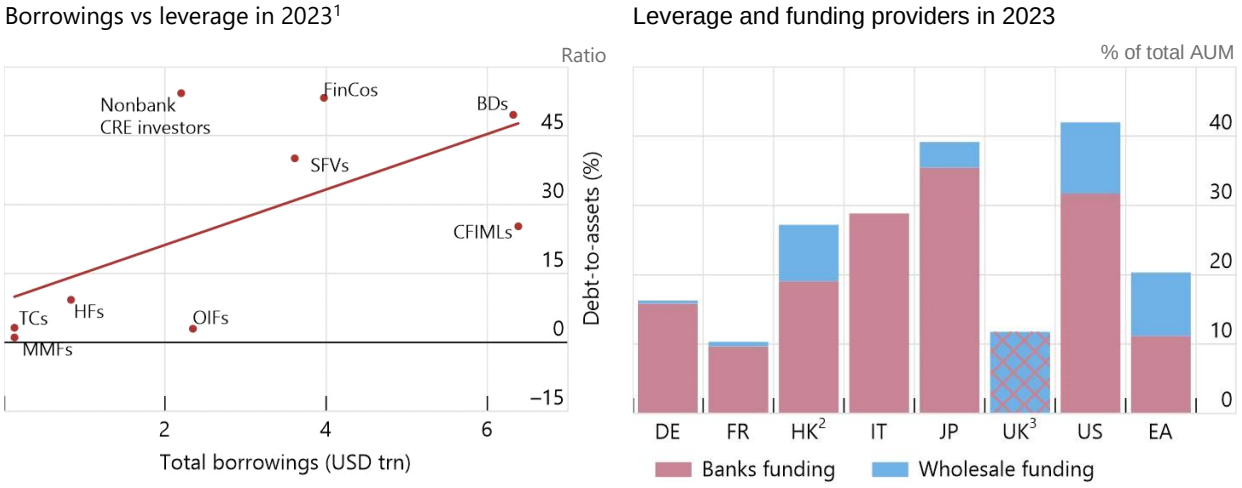
[49] See S&P Global (2024), *US REIT share repurchase activity swells in Q2 2024*, August.

3.2. Financial leverage

Measurement

Financial leverage in non-bank CRE investors appears to be larger than in other entities of the NBFI sector. At the aggregate level and across jurisdictions, the debt-to-asset ratio stood just above 45% in 2023 (Graph 13, left panel). While there are significant data gaps in identifying separately bank and wholesale funding, banks appear to be the main providers of funding to non-bank CRE investors (Graph 13, right panel).[50] Financial leverage appears to be higher for closed-end structures (both REITs and closed-end property funds represent a large share of non-bank CRE investors in Italy, Japan, and the United States, see Section 2).

Financial leverage of both property funds and REITs **Graph 13**



[1] Non-bank CRE investors include property funds, eREITs and mREITs. BDs = broker-dealers; CFIMLs = captive financial institutions and money lenders; FinCos = finance companies; HFs = hedge funds; MMFs = money market funds; OIFs = investment funds other than MMFs and hedge funds; SFVs = structured finance vehicles; TCs = trust companies [2] HK REIT wholesale funding includes all market-based funding, even if debt issued is held by retail investors. [3] The UK data comprises the total of both banking and wholesale funding. Jurisdictions were asked to report all types of debt-financing (debt securities, loans, repo).

Source: Jurisdictions' 2024 submissions to the FSB Global Monitoring Exercise on NBFI (national sector balance sheet and other data); and member submissions; FSB.

While data collected for the report was at an aggregate level, several members report that there are pockets of high leverage in some entities (see Box 3 on vulnerabilities and macroprudential measures for the property funds sector in Ireland, and RBA work showing a tail of highly leveraged unlisted trusts).[51]

There is indeed a tail of REITs and property funds with significant levels of leverage.[52] This is the case in several jurisdictions (REITs in Canada, Singapore, and the United States and closed-ended property funds in Germany), where a pocket of non-bank CRE investors present large

[50] Some jurisdictions (Italy and the United States) could only identify banking funding, while others (the United Kingdom) could not fully distinguish bank funding from wholesale funding using readily available data for funds.

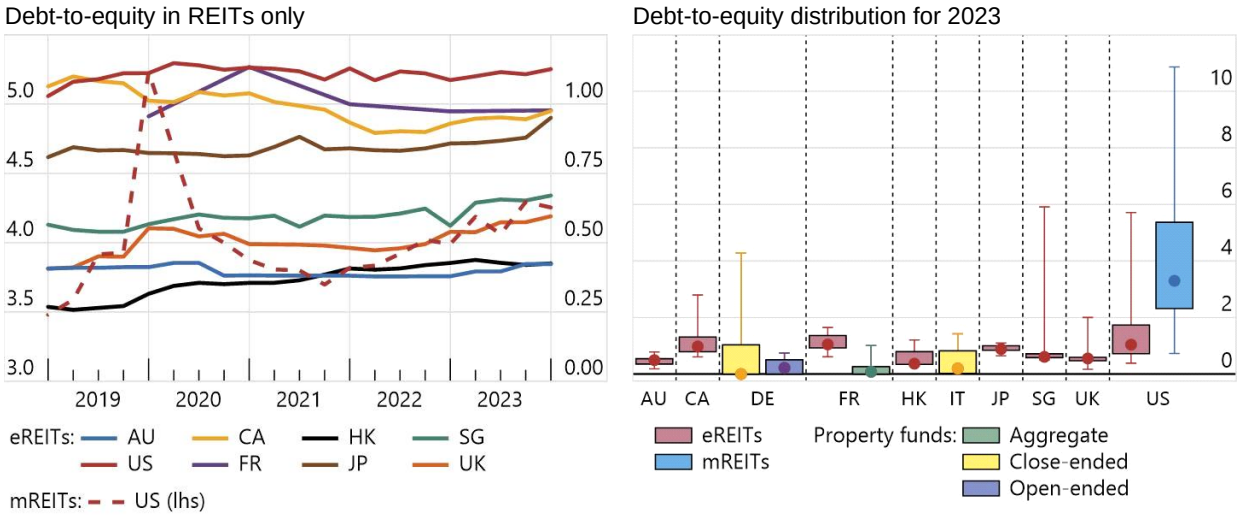
[51] See Lim et al. (2023), *Financial Stability Risks from Commercial Real Estate*, September.

[52] The analysis of leverage used supervisory data in France, Italy, and Germany for property funds and commercial data for REITs in Australia (24 REITs for $103 billion), Canada (30 REITs for $138 billion), France (17 REITs, $170 billion), Hong Kong (11 REITs for $63 billion), Singapore (11 REITs for $47 billion), the United Kingdom (15 REITs for $56 billion), and the United States (180 eREITs for $1,822 billion and 131 mREITs for $581 billion).

levels of leverage with debt being at least three times equity (Graph 14). Some of these high-leveraged investors are also large in size, holding more than $20 billion of assets (Graph 15).

Debt-to-equity ratios

Ratios **Graph 14**

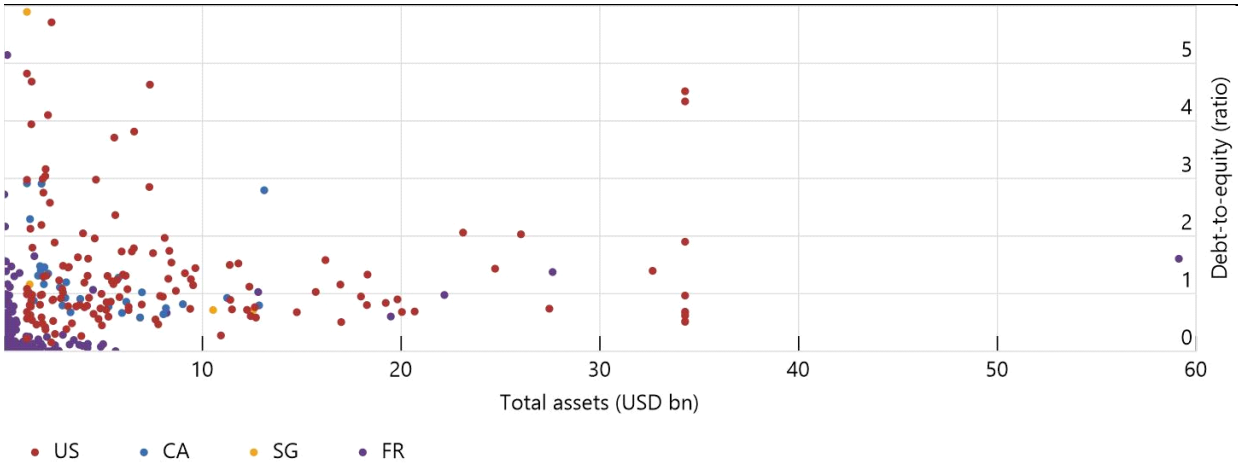


Notes: See footnote 52 for information on data included in the analysis.

Source: S&P; Datastream; Eikon; FSB.

REITs' debt-to-equity ratio by asset size

Graph 15



Source: S&P; Eikon; FSB.

As previous work has shown,[53] leverage can magnify losses for non-bank CRE investors and transmit shocks via a position liquidity channel (in case of deleveraging) and via a counterparty channel (in case of difficulties to repay funding provided). Of particular relevance are non-regulatory thresholds specified in loan covenants or used by credit rating agencies in their scoring. When CRE prices decrease, financial leverage mechanically increases, and if such thresholds are breached, this could result in forced deleveraging and impact other investors in CRE. Box 4 illustrates such scenarios by analysing hypothetical stresses.

[53] See FSB (2023), *The Financial Stability Implications of Leverage in Non-Bank Financial Intermediation*, September.

Box 4: Assessing vulnerabilities of eREITs to a CRE market downturn – A stress-testing approach[54]

eREITs are one of the key non-bank investors in the CRE market. By end-2023, their combined total assets and annual CRE transaction volume represented approximately 25% and at least 18% of the global CRE market, respectively.[55] Given their substantial exposure to the CRE market, the significant stress on CRE values in recent years may have financial implications for the eREITs, with possible spillovers to other financial institutions closely interconnected with them, including their bank lenders.

A primary concern revolves around the leverage of eREITs, which is typically capped at 60% of their total assets as mandated by their lenders.[56] As the value of their CRE holdings declines, eREITs may be forced to sell some of their CRE assets at steep discounts to avoid triggering the leverage limit, amplifying pro-cyclical price dynamics in the CRE market, and with potential knock-on effects on banks highly exposed to eREITs.

The Hong Kong Monetary Authority (HKMA) conducted a stress test on 600 global eREITs specialising in the office, retail, industrial, or diversified sectors.[57] The test assumed a decline in CRE values ranging from 10% (mild scenario) to 40% (severe scenario) from the end of 2023, with the severe scenario reflecting a historical episode of very severe global CRE market stress.[58]

The results indicate that the median debt-to-asset ratio of the sampled eREITs would sharply increase to between 44% and 67%, compared to 40% at the end of 2023. Consequently, between 13% and 55% of the sampled eREITs would see their debt-to-asset ratios exceed the typical cap of 60%, up from just 8% at the end of 2023.

The results suggest significant risks of forced property liquidations and credit defaults faced by eREITs. Specifically:

- Risks of forced property liquidations: The sampled eREITs would sell off an additional amount of their CRE assets over a year after the scenarios, estimated to be between 3% and 13% of the aggregate CRE transaction volume during 2023 (left panel, Graph C1). Also, the impact is found to be non-linear, with those eREITs violating the usual leverage limit reacting much more strongly with asset liquidation.
- Credit default risks: Approximately 5% to 16% of the sampled eREITs would lose their investment-grade (IG) status under the downside scenarios (blue bars, right panel, Graph C1), indicating a marked increase in credit default risks of eREITs during a CRE market downturn. In the event of a credit default, the shock may spill over to the wider financial system, as eREITs often rely on borrowings from other financial institutions such as banks.

In addition, the findings point to significant regional and sectoral variations in the eREIT sector:

- Regional level: the differences in the extent to which eREITs listed in different regions are affected by the stress mainly reflect different levels of financial leverage. This translates into

---

54 See Leung et al. (2024), *Assessing the risks of forced property liquidations and credit downgrades of real estate investment trusts in a commercial property market downturn: A stress-testing approach*, September.

55 These figures are derived by comparing data from multiple sources, including the total asset size of eREITs from S&P Capital IQ, the CRE market size from MSCI (2024), and the annual CRE transaction volume from CBRE (2024).

56 See S&P Global Ratings (2023) *Uneven global office recovery is squeezing credit quality*. October; Moody's (2014) *US REITs – REIT structure and bond covenants attenuate credit risk*. May; and PIMCO (2012) *Real estate resiliency: the 'REIT model' proves its mettle*. August.

57 The sample excluded residential, hospitality, specialised and healthcare eREITs and accounted for around 76% of the REIT aggregate at the end of 2023.

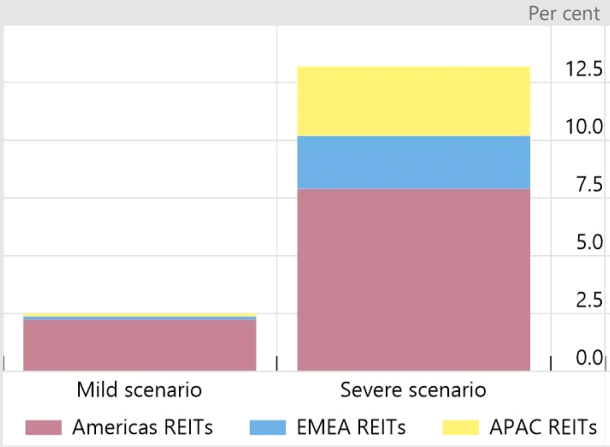
58 The severe scenario is comparable to the maximum annual decline in CRE values in the reporting jurisdictions from 1993 to 2023, where data are available, based on data from the BIS.

different volumes of CRE liquidations (left panel, Graph C1) and in different proportion of listed eREITs maintaining their IG status under these scenarios (right panel, Graph C1).

- Segment level: Due to relatively lower leverage, eREITs specialising in the industrial segment are also found to be less vulnerable to breaches of leverage limits, forced property liquidations, and credit downgrades compared to their counterparts focused on the office, retail and diversified segments under the downside scenarios.

Estimated property liquidations and credit ratings **Graph C1**

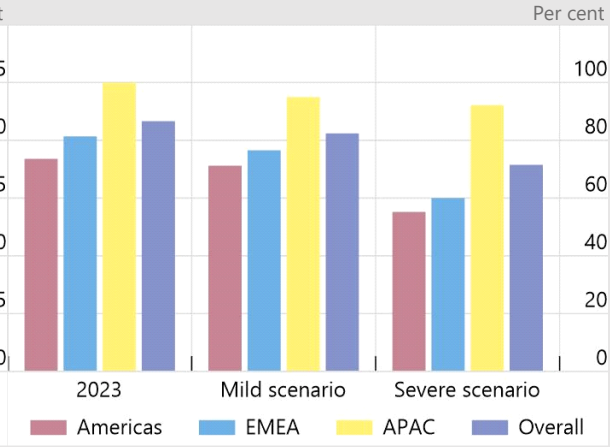
Estimated property liquidations of eREITs



Notes:

1. Each bar denotes the estimated increase in total property sales of the sampled eREITs over a year after the given scenario, expressed as a percentage of global CRE transaction volume in 2023 (CBRE, 2024); and
2. The figure for each coloured portion represents the share of property sales contributed by eREITs listed in the given region.

Estimated share of IG-rated eREITs



Notes:

1. Each bar represents the share of IG-rated sampled eREITs under the given scenario, expressed as a percentage of total number of the sampled eREITs.
2. The figure for each coloured bar represents the share of IG-rated eREITs listed in the given region; and
3. This chart uses a subset of the sampled eREITs as credit ratings are not available for the rest of them.

Sources: S&P Capital IQ, CBRE (2024), Bloomberg and HKMA staff estimates.

In conclusion, the results of the stress test underscore the potential for forced property liquidations and increased credit default risks within eREITs under the extreme but plausible scenarios. As such, it is crucial to monitor CRE investors' response to these developments, as their deleveraging could amplify pressure on the market. Also, authorities need to be mindful of and potentially prepare for abrupt changes in sell-off of CRE assets and their potential spill-over to the wider financial system.

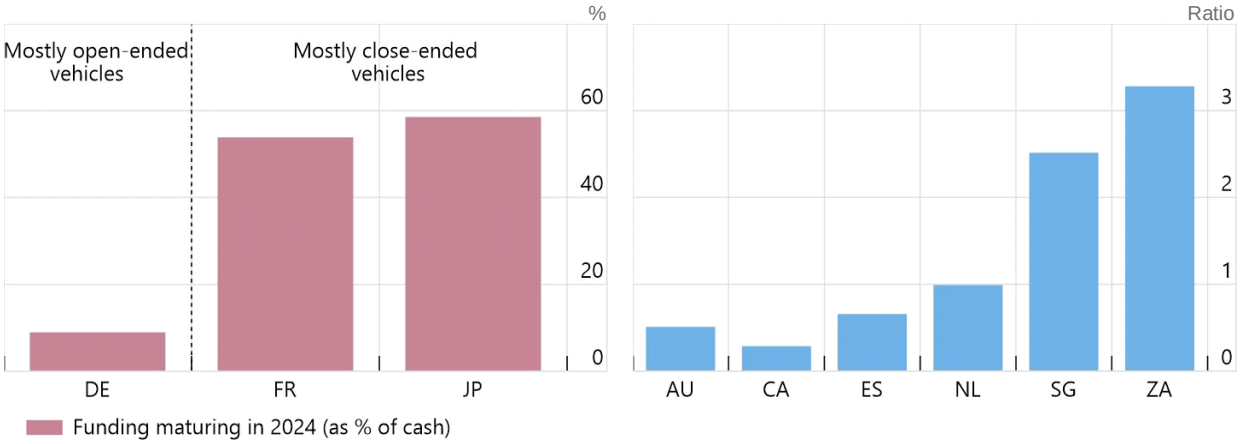
Refinancing needs

While there are only limited data on funding maturity, non-bank CRE investors may be vulnerable to rollover risk related to the refinancing of their debt. Indeed, a few jurisdictions could provide the amount of funding maturing over the next year (in 2024 as data were as of end 2023). In jurisdictions with a large share of closed-ended vehicles, the debt maturing in 2024 was greater than 50% of non-bank CRE investors' cash positions (Graph 16, left panel). In jurisdictions with a large share of open-ended vehicles, cash positions were typically higher, reflecting their management of potential redemption requests. In addition, and as the right panel of Graph 14 suggests, open-ended funds tend to have lower levels of leverage. Finally, REITs need to distribute a significant share of their earnings (if not all) to shareholders via dividends to retain tax advantages and, as a result, cash positions are typically low. These factors highlight the differing liquidity risk profiles of open-ended and closed-ended vehicles.

The right panel of Graph 16 uses data collected by the FSB for its latest Global Monitoring Report on NBFI to compare wholesale funding maturing in 2024 with cash, but also takes account of the net repo positions. A ratio higher than 1 suggests that wholesale funding needs were greater than cash positions in 2024. This highlights the need for rolling over funding, and therefore the interest rate and rollover risk to which non-bank CRE investors are exposed.[59]

REITs and property funds refinancing needs[1]

In per cent **Graph 16**



[1] Both panels include REITs and property funds. [2] This ratio is calculated by dividing short-term wholesale funding with deposit assets; the absolute value of the net repo position (repo assets less repo liabilities) is considered a source of liquidity if positive (i.e. is added to the denominator) or increases liquidity demand if negative (i.e. is added to the numerator).

Sources: FSB member submissions and jurisdictions' 2024 submissions to the FSB Global Monitoring Exercise on NBFI (national sector balance sheet and other data).

Until 2022, eREITs may have benefitted from favourable conditions allowing them to refinance. Despite uncertainty on CRE valuations, at time of refinancing there may be sufficient value in underlying properties given loan-to-values have improved since the GFC, thereby offsetting affordability concerns.[60]

Commercial data shows that more than one third of eREITs' debt is maturing in the next three years (Graph 17, left panel). This is a consistent finding over the historical data available, highlighting that eREITs roll over their funding frequently. This is also confirmed by the relative stable distribution of the interest coverage ratio (Graph 17, right panel). By the end of 2025, 18% of total debt will have matured, and will potentially be renewed with higher interest rates.

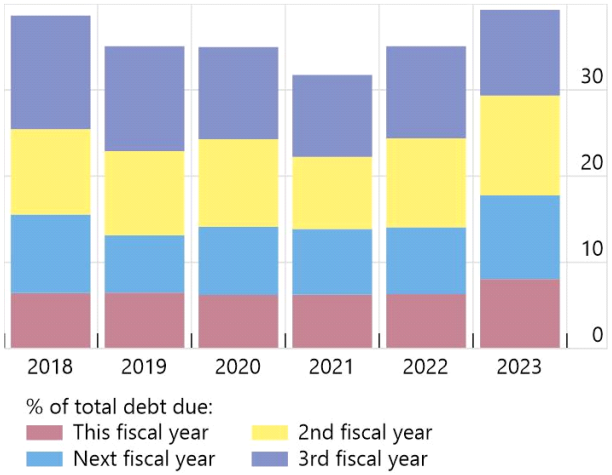
[59] If interest rates were to stay high (or increase), debt would be more costly and could lead some non-bank CRE investors to deleverage by selling some properties, especially if they cannot increase income (e.g. by raising rents). Another scenario could be that where banks or other lenders reduce their risk appetite to lend to non-bank CRE investors – for example because of recognising significant and delayed losses – which could then face difficulty in rolling over their debt.

[60] See Moody's (2023) *What's the Real Situation with CRE and Banks: Doom Loop or Headline Hype?*, April.

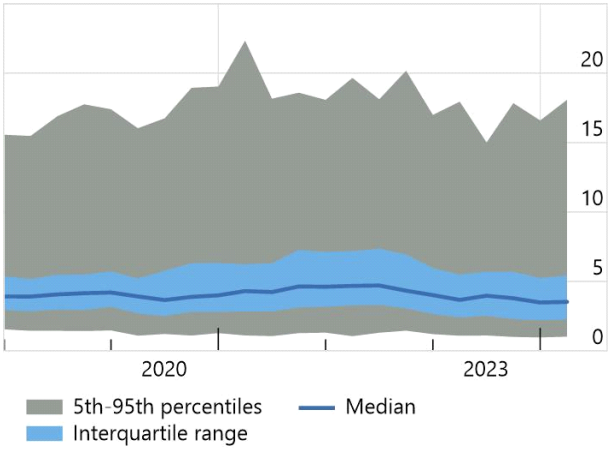
Focus on eREITs' refinancing

Ratios **Graph 17**

Maturing debt[1]



Interest coverage distribution[2]



[1] Includes data for eREITs in CA, DE, ES, IN, IT, NL, SG, and the US. [2] Interest coverage defined as EBITDA over interest expenses.

Sources: Jurisdictions' 2024 submissions to the FSB Global Monitoring Exercise on NBFI (national sector balance sheet and other data); workstream submissions; S&P; FSB.

Across the market there has been an increase in loan modifications primarily in the form of "extend and pretend" practices. Lenders are extending the maturity of a loan to avoid recognising a loss and delaying the higher financing costs for borrowers. These modifications would typically be short term extensions and are subject to the level and volatility of interest rates. Some banks have been undertaking this in their own CRE loan portfolios as well as in lending to REITs.[61] Similarly, there has been a sharp increase of loan modifications in securitised CRE loans (Graph 18, left panel).[62] Engagement with private stakeholders indicated that loan modifications often led to equity injection from borrowers' shareholders. Some stakeholders also highlighted maturities further out were likely to be vastly understated given this renewal practice; a point supported by market research (Graph 18, right panel). Looking ahead, some stakeholders felt the extend and pretend practices may fall away once lenders envisage receiving close to the collateral value upon exiting distressed investments; thereby minimising any losses.

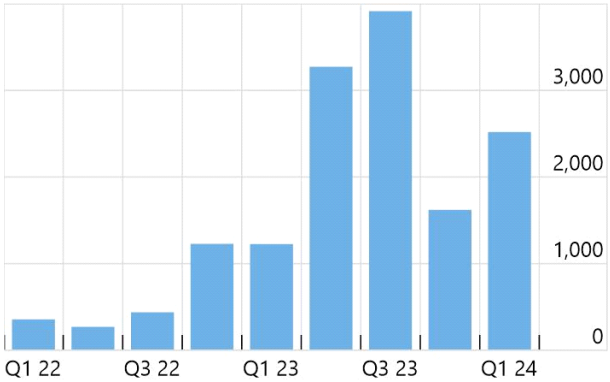
61 See Crosignani and Prazad (2024), *Extend-and-Pretend in the U.S. CRE Market*, October.

62 See CrediQ (2025), *Extend & Pretend Trend – Modifications Double within 12 Months*, January.

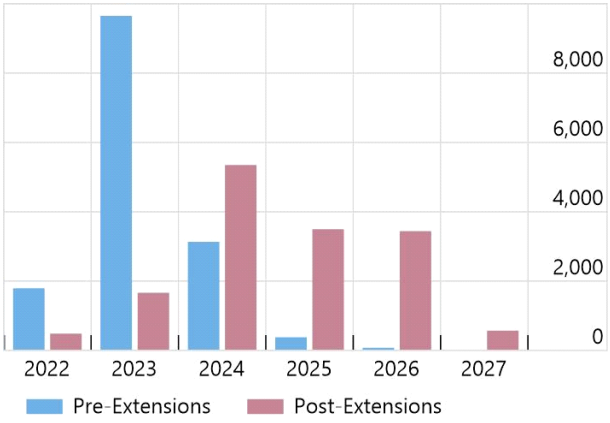
Loan modifications

In USD millions **Graph 18**

A. Loan modification volumes



Maturity schedule "before and after" loans extended between 2022 and 2024, inclusive



Source: Trepp.

3.3. Valuation uncertainty and delayed recognition of losses

CRE assets are difficult to value given the low number of comparable transactions, widespread use of mark-to-model practices, lack of up-to-date data, and difficulty to incorporate some factors. Furthermore, recent research suggests banks did not significantly lower the reported valuations of the real estate they held as collateral.[63] Box 5 summarises these challenges.

This opacity is accentuated by the fact that the valuation of assets held by property funds and REITs is infrequently updated. Contrary to most other types of mutual funds that value their assets daily, property funds and REITs generally have to value their assets at a lower frequency and according to members' inputs, in many jurisdictions at least once per year or twice per year.[64] On the one hand, this delay can help these non-banks look through a temporary stress. On the other, it may make the segment prone to sudden episodes of increases in risk aversion, when investors anticipate losses as non-bank investors are slow to recognise portfolio losses amidst a dearth of comparable transactions, thereby incentivising herd behaviour. This may also lead to deleveraging as covered in Box 4. Private stakeholders highlighted challenges with valuations due to market participants preferring valuations based on comparing the asset in question to (similar) assets recently transacted in the market, rather than using the outcome of internal valuation models (e.g. cashflow projections). In the view of some stakeholders, this reliance on market comparisons accelerated valuers' negative perception of the market, leading to procyclicality, short-term illiquidity and price dislocation.[65]

63 See Horan et al. (2023), *Asset prices, collateral and bank lending: the case of Covid-19 and real estate*, June.

64 There are cases with more frequent valuations, such as in Germany where retail property funds have to value their assets quarterly.

65 This is not to say that valuations based on model are inherently better and less procyclical. See Box 5 for an overview of valuation methods and their shortcomings.

Box 5: Valuation of CRE assets

Member authority analyses suggest that there are a number of different techniques adopted in the industry to value CRE assets. This box summarises the common techniques, the role interest rates play in the estimation and the potential shortcomings of each method.

The *market (or sales) approach* uses comparable transactions in the market to determine what the property could be sold for. This is the preferred method, if data is available, as it provides an indication of what the asset is worth to potential buyers in the market.[66] However, interest rates can impact the availability of comparable transactions. Rising interest rates leads to higher borrowing costs for buyers which can reduce demand thereby a slowdown in transactions. Conversely, the sellers may be reluctant to acknowledge the decline in value of their property (e.g. due to lower occupancy rates, higher prevailing interest rates that reduce the discounted cash flows, decreased demand for their property), which in turn can reduce supply. This makes it more difficult to use subsequent transactions as a comparator due to fewer data points and it being harder to separate market wide and asset specific concerns (e.g. of fire sales).

The *income approach* uses future expected cashflows to estimate the current value of the asset. While different models can be used, they all require assumptions about the length of time the property will be held, the income it will generate in each period, and what will be done with it at the terminal stage. Interest rates influence the discount rate used to calculate the present value of future cash flows. When interest rates increase, the current value of an asset decreases (assuming all other factors remain constant) because the rising opportunity cost prompts investors to demand a higher rate of return to preserve their risk premium.

The *cost approach* looks at what it would take to recreate the asset from the ground up. This method is suitable for highly specialised assets where there is no comparable transaction data and the assets do not earn income, or else for assets that are easily replicable (e.g. a shed). Interest rates impact the cost of financing which can have two opposing effects on valuations. When interest rates increase it becomes more expensive to recreate due to the higher cost of debt which means the valuation increases. However, this also translates into market illiquidity so the value of components such as land may decrease. This illustrates the importance of selecting an appropriate valuation methodology for the asset in question.

Automated Value Models are statistical models that take inputs from market data and features of the property in question to reach a valuation. The underlying model tends to use the *market approach* but could also consider other factors. They are often employed when the valuer is looking to reduce costs and time to value properties, such as holders of a large portfolio of real estate. Some authorities only permit these to be used when there is a valuer who understands all model inputs and assumptions, there is a large data sample with sufficient granularity, and valuations are subject to back testing. [67]

Recent work by the ECB[68] has indicated several shortcomings associated with these methods of valuing property, as well as some supervisory and governance flaws when using these methods.

The valuation approaches described above rely on comparable data being available that reflects current market conditions, whether that be rental prices, sale prices, or construction costs. In an illiquid market this data can be difficult to source, leaving some valuations relying on out-of-date information. This is particularly true for market data which, even in normal conditions, tends to be subject to a time lag.

Assumptions may not capture all relevant dynamics, namely property specific features. For example, significant damage to a building, or long-term vacancy leading to squatters, will have negative impact

66 See International Valuation Standards Council (2016), *IVS 105 Valuation Approaches and Methods*, April.

67 See European Banking Authority (2020), *Final Report – Guidelines on Loan Origination and Monitoring*, May.

68 See Darrieux et al. (2024), *Commercial real estate valuations: insights from on-site inspections*, August.

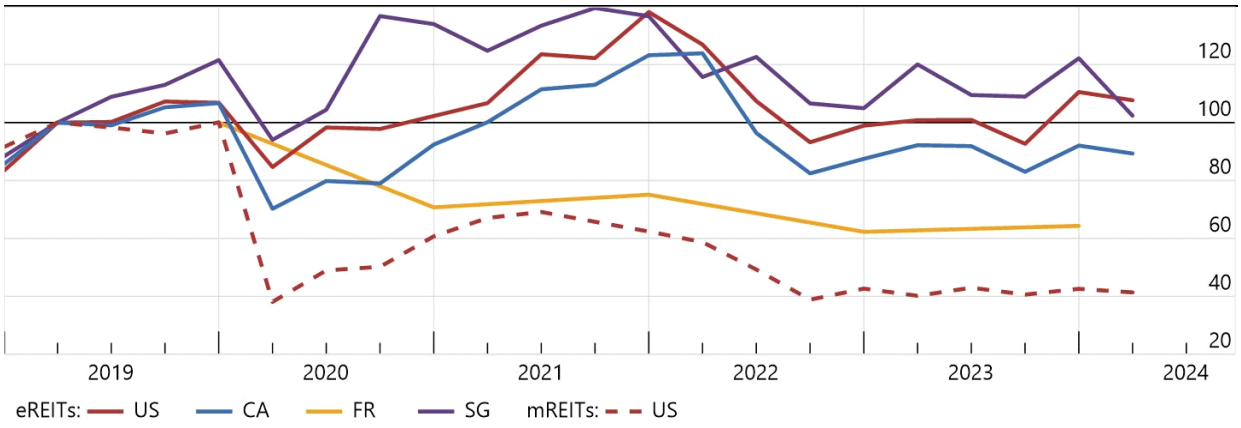
on the value. The ECB found that many banks were taking valuations based on assumptions that did not align with the actual state of the underlying property.

Finally risks stemming from climate change and other environmental events are still poorly quantified in real estate valuations.[69] This includes adverse effects from extreme weather events, such as flood damage, and related costs such as insurance, as well as the expenditure needed, for some segments, to get a property to meet new energy efficiency standards. Failing to include these vulnerabilities could lead to sharp revaluations down the line as risks manifest.

This valuation lag also introduces challenges in monitoring non-bank investors' CRE losses for the purpose of financial stability. To overcome this, the performance of listed REITs could be used as a proxy, even though it is subject to certain limitations.[70] Losses on direct exposure can be more easily estimated by combining commercial price indices with data on the CRE segment to which non-bank investors are exposed (e.g. office or multi-family). In theory investors' expectations on losses should be reflected in the price per share and price to book ratios of property funds and eREITs that are actively traded; this is similar to analysis undertaken to monitor the health of the banking sector. Commercial eREITs data suggests the price per share captures concerns about the CRE market as the interest rate cycle turned (Graph 19).

eREITs price per share

Q1 2019 = 100 **Graph 19**



Notes: See footnote 52 for information on data included in the analysis.

Source: S&P; FSB.

Another proxy is to use banking data on CRE non-performing loans (NPLs) and default of bank CRE loans (Graph 20, both as a proportion of total CRE loans).[71] There is a slight increase in the default rate for Germany, Netherlands, and South Africa between 2022 and 2023. Aggregate banks' NPLs do not indicate an increase since 2022. However, segment specific NPLs (available

69 See, for example, Baldauf et al. (2020), "Does Climate Change Affect Real Estate Prices? Only If You Believe In It", *The Review of Financial Studies*, March, Addoum et al. (2021), *Climate Change and Commercial Real Estate: Evidence from Hurricane Sandy*, March, DNB (2022), *Real estate and climate transition risk: A financial stability perspective*, February, Holermans et al. (2022), *Climate Risk and Commercial Mortgage Delinquency*, March, UN (2023), *Climate Risks in the Real Estate Sector*, March; and Ling et al. (2023), "Climate Change and Commercial Property Markets", *Journal of Regional Science*, April, Xiao (2024), "*Climate Transition Risk and Commercial Real Estate*, April, and Darrieux et al. (2024), *Commercial real estate valuations: insights from on-site inspections*, August.

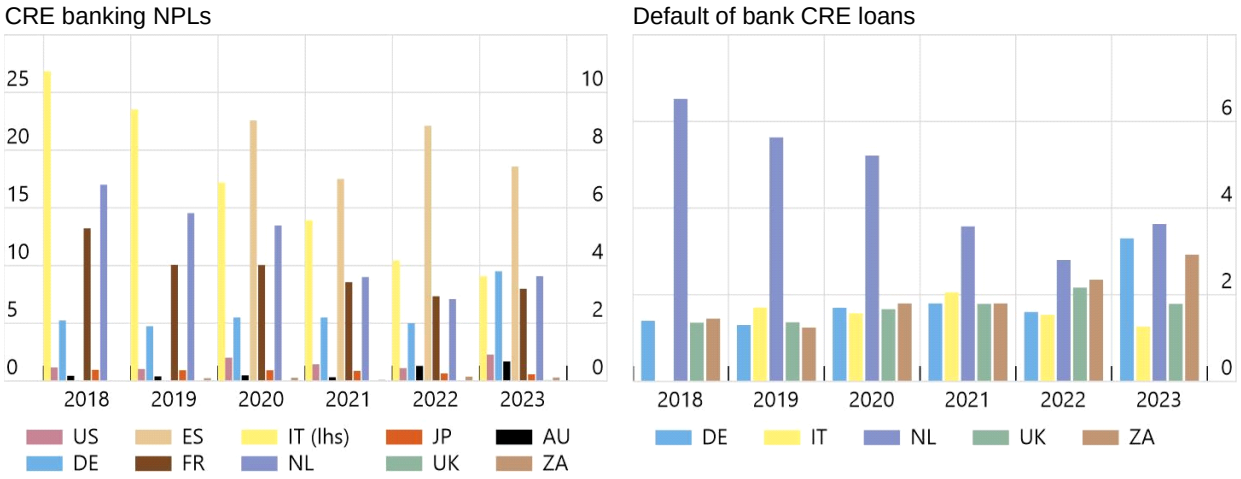
70 An issue with this approach is that REIT prices can be affected by market sentiment, which can easily be transmitted from one jurisdiction/segment to another. Also, REIT portfolios can be very heterogeneous.

71 Note that there might be differences in definitions of NPLs and defaults across jurisdictions, and so trends may be more comparable than levels.

in Australia, Italy and the United States) show a different trend: Graph 21 highlights the concerns around the office sector, with NPLs increasing significantly from 2022 to 2023 in some jurisdictions.[72] The retail segment has higher levels of NPLs relative to other sectors. Data on mREIT NPLs also show a slight increase from 2021 to 2023.[73]

CRE loan quality

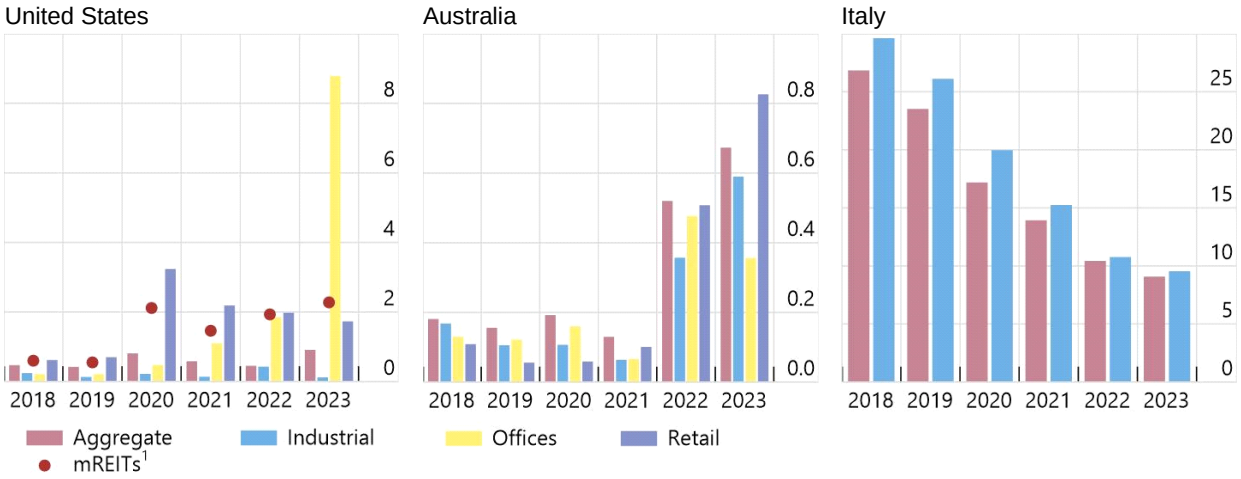
In per cent **Graph 20**



Sources: FSB.

CRE NPLs breakdown by segment

In per cent of total CRE loans **Graph 21**



[1] Available only for the United States.

Sources: FSB.

[72] See EBA (2024), *Risk assessment report special topic – CRE-related risks*, July.

[73] This may indicate that the aggregate bank CRE portfolio is of better quality than that of non-banks, and/or balanced towards other segments than office and retail.

Finance companies holding CRE loans may be particularly vulnerable to CRE losses for a couple of reasons,[74] although evidence is limited. First, finance companies typically focus on riskier market segments not covered by banks. Second, they are not always subject to the same prudential requirements as banks and therefore equity available to absorb losses might be lower and leverage higher than for banks. Data gaps prevented member authorities contributing to this report from sharing data on finance companies.

3.4. Interlinkages and spillovers to the banking sector

While there has been some increase in banks' CRE-related NPLs for certain segments, the stress in CRE markets has not caused systemic issues in the banking sector so far. The large banks seem to have, in first instance, limited exposures, however, regional banks in some jurisdictions were more exposed relative to their size and in riskier segments of the market.[75] In addition, recent research has identified some banks undertaking an "extend-and-pretend" approach to distressed CRE mortgages by providing additional credit to their impaired legacy borrowers.[76]

In addition to lending to CRE borrowers, banks (especially larger ones) offer unsecured credit lines to non-bank CRE investors.[77] These commitments are generally off-balance sheet and therefore difficult to measure. Non-bank CRE investors also make greater use of these credit lines during episodes of stress, and the average utilisation rate is higher for REITs than for other intermediaries. Further, the extend and pretend approach has been observed for exposures where banks offered term loans to REITs.[78]

Banks may also be exposed to CRE via investments in CMBS, warehouse lines to CMBS issuers, and via holdings of REIT and property fund shares (Graph 8). Engagement with private stakeholders also highlighted the range of other financing provided by banks Some argued this provided an effective redistribution of risk as banks benefitted with recourse to the non-bank investor and the underlying collateral while non-banks were able to be active in the CRE market. Some also noted non-banks were vulnerable to margin calls from banks but had not seen this occur to date.

Finally, there are some interlinkages across financial institutions due to their exposures to property developers. At their core, developers are business entities who purchase land and develop the underlying new properties and/or renovate existing properties. This would be funded by loans, mostly from banks. Once the development is completed, they will then either sell or lease the property to other businesses. While property developers' shares are mostly held by non-financial corporations, they also receive equity funding from financial institutions, especially REITs, which may be another spillover channel affecting banks. Lastly, in some jurisdictions,

---

74 See FSB (2024), *Depositor Behaviour and Interest Rate and Liquidity Risks in the Financial System: Lessons from the March 2023 banking turmoil*, October: Graph 4 and metrics for "mortgage lenders".

75 See Box 1 in Bank of Japan (2023), *Financial System Report*, October; Faria-e-Castro (2024) *Recent Trends in Banks' Commercial Real Estate Exposure*, July; and IMF (2024) *Financial Stability Risks from Commercial Real Estate*, July.

76 See Crosignani and Prazad (2024), *Extend-and-Pretend in the U.S. CRE Market*, October.

77 See Acharya et al. (2024), *Shadow Always Touches the Feet: Implications of Bank Credit Lines to Non-Bank Financial Intermediaries*, May.

78 Ibid.

asset managers are part of banking or insurance groups. Hence, problems in the property fund sector could also spill over to banks via intra-group channels, e.g. step-in risk.

4. Data gaps

This report identified data gaps over the course of the analysis of CRE exposures and vulnerabilities in non-bank CRE. Member authorities made significant improvements in their data since the global financial crises. For example, most participating jurisdictions have access to physical property indices, transaction volumes and vacancy rates. Such indicators are helpful to assess recent developments in the broader CRE market and its segments (office, retail, etc.) However, the report identified several gaps linked to (1) CRE market data; (2) the identification of all CRE market participants; (3) the details of the exposure to CRE on the asset side of balance sheets; (4) the counterparts on both sides of the balance-sheets (5) and banks' range of exposures to CRE. The main data gaps are as follows:[79]

- There is no comprehensive data on all financial institutions exposed to CRE markets. In several jurisdictions, there is a lack of information about the exposure of some entity types, namely mREITs in jurisdictions other than the United States, private funds and finance companies specialised in CRE lending. As a result, this report likely underestimates the size of equity and debt financing by non-bank CRE investors.

- Granular data on the asset side of non-banks' balance-sheets were not available. The analysis of exposures did not distinguish by type of exposure (debt or equity-like) and the CRE segment, and whether exposures were via a collective investment vehicle or directly held on the balance sheet. Only a few jurisdictions were able to identify property funds' and REIT's exposure to overseas CRE.

- On the liability side, it was not always possible to identify both funding from banks and wholesale funding. The maturity breakdown of funding is often not available, which hinders analyses of refinancing needs. When data are available, it is usually for the next year only (i.e. for the year 2024 given that this report uses mostly data as of 2023). It was also not possible to consistently identify who holds the units of property funds and REITs, impeding the analysis of linkages in all but a few jurisdictions. The share of foreign investors in REITs and property funds was only available in one jurisdiction.

- While most jurisdictions were able to share data on banking exposure to CRE, not all could distinguish the type of exposure (CRE loans, loans collateralised with CRE, holdings of CMBS etc.) Further, bank NPL and default data by CRE segment were only available in three participating jurisdictions.[80] Other exposures of the banking sector to

[79] Note that, in certain cases, data were available but not shareable, e.g. as they were sourced from commercial providers who impose restrictions on sharing data. This was in particular the case of data on CRE assets (such as transaction volumes).

[80] Part of the limitation is that CRE data may come from different data sources. For example, in the US, bank CRE exposures from regulatory reports use data on loans collateralized by CRE properties (owner-occupied or not, or by type of activity, say construction, multifamily), which may be different than CRE exposures from commercial data vendors reported by CRE property type (retail, office, industrial etc.) and/or geographic distribution. These datasets cannot always be combined with data on banks' or non-banks' exposures.

CRE such as through investment vehicles (REITs and property funds) and credit lines was not readily available.

- Engagement with private stakeholders highlighted data gaps in commercial coverage even with larger institutions supplementing this with proprietary data sources. Data on debt funding was seen as the least available and would go out of date quickly. Most data tend to be based on average values thereby limiting information in a divergent market.

Property funds tend to be authorised and supervised by securities regulators, and the associated data collected are primarily for investor protection and market conduct purposes. There is also some publication of data for the public and investors. Listed REITs tend to have the same type of requirements, with typically a large set of data published. Private funds and unlisted REITs operate in fewer jurisdictions and have less oversight and data available. Finance companies are typically either closely supervised or subject to important reporting requirements, however, there seems to be not enough granular data for allowing the identification of CRE lending activities. Structured finance vehicles issuing CRE-securitised assets are typically not supervised, but given their assets are issued on public markets, data do exist and can be collected via data vendors.

5. Conclusions and policy implications

Given existing data gaps, the analysis of non-bank vulnerabilities in this report focused on property funds and on REITs. Three main vulnerabilities were identified: (i) a liquidity mismatch for some open-ended property funds; (ii) pockets of highly leveraged REITs and property funds, and the need for them to roll over their maturing debt; and (iii) valuation uncertainty and delays in recognising losses. These vulnerabilities may interact with each other. The report also identifies a fourth broader vulnerability around the range of complex interlinkages between banks and non-bank CRE investors, which is difficult to assess.

Liquidity mismatches may be important in property funds in some jurisdictions, where most of these funds are open-ended, often offering daily or monthly dealings to their investors.[81] The FSB has published recommendations to address structural vulnerabilities from liquidity mismatch in open-ended funds,[82] which are relevant for funds exposed to CRE given that selling properties may take a considerable amount of time. In particular, the redemption terms that open-ended funds offer to investors should reflect the low levels of liquidity of their CRE holdings in normal and stressed market conditions. Some jurisdictions have already put in place notice periods and minimum holding periods (e.g. Germany) and others require property funds to be structured as closed-ended (as is the case in Italy).

Liquidity mismatches may be less pronounced in REITs and in other closed-ended structures. Unlisted REITs typically offer share buyback programmes to provide investors access to liquidity and allow them to redeem. In a few cases, some investors have not been able to participate in

81 That is, the AUM of open-ended property funds is a large proportion of AUM held by all property funds.

82 See FSB (2023), *Revised Policy Recommendations to Address Structural Vulnerabilities from Liquidity Mismatch in Open-Ended Funds*, December.

these programmes, given limitations due to unlisted REITs' cash positions. This may have a negative impact on REIT prices and contribute to negative market dynamics. Regular information on the number of investors wanting to but not able to participate in these share buyback programmes may therefore allow for better monitoring of liquidity mismatches.

There are pockets of highly leveraged REITs and property funds, which hold sizeable amount of assets and could therefore propagate shocks in the CRE market and the financial system.[83] In some cases, debt may be more than 90% of property funds' assets and more than 10 times REITs' equity. Leverage may lead to forced sales via two propagation channels:

1. A decline in property valuations could lead non-bank CRE investors to breach non-regulatory thresholds (as specified in loan covenants or used by credit rating agencies in their assessments), potentially resulting in forced deleveraging. Further reporting of those investors' borrowing terms would allow better monitoring of this vulnerability.
2. Leveraged REITs and property funds need to roll over their maturing debt. Low cash buffers, as well as insufficient income or capacity to increase it in the short-term (e.g. via rents) may lead non-bank CRE investors to sell properties to meet interest repayments. Information on the maturity profiles of these borrowings, such as the extent to which debt will mature in the coming years, would help assess this vulnerability.

The third vulnerability is linked to the inherent opacity in valuations of CRE assets and delay in the recognition of losses on CRE exposures. There could be several ways to mitigate the impact of valuation uncertainty, such as through greater transparency or by ensuring that non-bank CRE investors take account of this uncertainty in their risk management.

A fourth broader vulnerability is linked to the range of complex interlinkages between banks and non-bank CRE investors, which is difficult to assess from available data and may be a source of spillover to the banking sector. While non-bank CRE investors may not be large enough in all jurisdictions to be a significant source of concern on a standalone basis, they may amplify and transmit shocks to banks. Given this, authorities may wish to consider the range of exposures when assessing banks' credit risk to CRE.

Macroprudential policies addressing CRE vulnerabilities are mainly implemented via the banking sector – in particular, via capital buffers and loan-to-value ratios. In addition, some jurisdictions have implemented policies for non-bank CRE investors, which could help mitigate some of the vulnerabilities identified in this report. The sharing of experiences among authorities with such policies may be useful.

Looking ahead, the ongoing monitoring of the CRE market is warranted given the more volatile performance of CRE exposures compared to other assets and various developments that could impact this market and hence its financing.

[83] The FSB is working on policy recommendations to address leverage in NBFI where it can create financial stability risks; see FSB (2024), *Leverage in Non-Bank Financial Intermediation: Consultation Report*, December.