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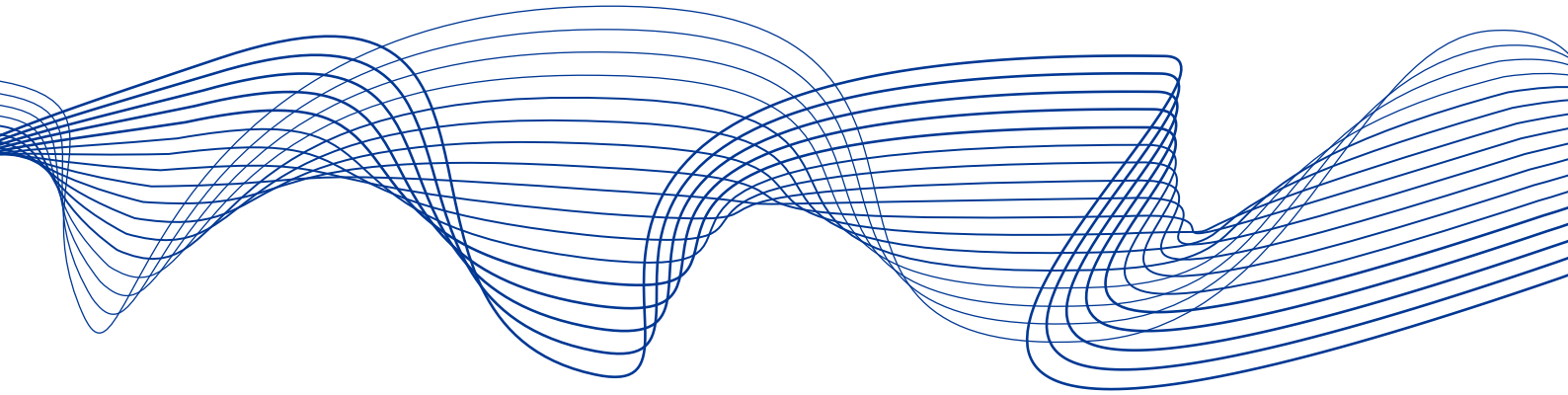
Addressing commercial real estate lending risks with borrower-based measures



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Abstract

This paper explores ways in which borrower-based measures (BBMs) could be applied to commercial real estate (CRE) lending, focusing on suitable metrics and scope. BBMs have already proven to be effective in mitigating credit risks in residential real estate lending by curbing excessive credit growth, limiting high-risk loans and strengthening lender resilience. However, implementing these measures in CRE lending is more complex due to the diverse and intricate financing structures commonly found in CRE markets. BBMs for CRE lending could be effective in mitigating systemic risk by targeting the following metrics: debt service and interest coverage ratios (DSCR/ICR) and limits on aggregate indebtedness at the firm level; and/or loan-to-value (LTV) ratios at the credit facility level. A key challenge is the threat of regulatory leakage, as CRE borrowers often rely on multiple financing sources. This is why firm-level metrics are recommended, aligning with existing market practices and minimising implementation complexity. By limiting credit access from regulated financial entities to CRE firms exceeding these thresholds, such a framework would also indirectly cover lending by non-regulated lenders. National authorities should have the flexibility to calibrate and activate these measures, tailoring them to the unique characteristics of their CRE markets. This paper also aligns with the ESRB Recommendation to the European Commission ESRB/2022/9 D, which calls for activity-based macroprudential tools to address CRE vulnerabilities and to prevent regulatory arbitrage. The paper outlines the rationale, implementation strategy and forward-looking considerations for CRE BBMs.

Keywords: Commercial real estate, borrower-based measures, lending, system-wide approach

JEL codes: G20, G28, R33

Executive summary

Borrower-based measures (BBMs) have proven effective in addressing credit risks associated with residential real estate (RRE) lending by curbing excessive credit growth, reducing the prevalence of high-risk loans, and preventing the undue relaxation of credit standards. They have also helped to make lenders more resilient. Commercial real estate (CRE) lending is significantly more complex than RRE lending, making it harder for policymakers to implement these tools in CRE markets. This paper considers ways in which BBMs could be implemented in CRE markets, taking into account the complex mix of financing structures that exist in such markets, by asking what type of activities CRE BBMs should cover and then investigating useful metrics that CRE BBMs could target.

BBMs for CRE lending could succeed in mitigating systemic risk by targeting the following metrics: debt service and interest coverage ratios (DSCR/ICR) and limits on aggregate indebtedness at the firm level; and/or loan-to-value (LTV) ratios calculated at the level of credit facilities. These measures could be used simultaneously and also in combination with capital-based macroprudential measures where warranted.

While CRE lending has traditionally been, and indeed remains, dominated by bank loans, other forms of lending, such as bond issuance, have grown in significance over time and account for a larger share of CRE total lending than they do for RRE lending. The fact that CRE borrowers frequently rely on a mix of financing sources poses a key challenge in implementing CRE BBMs by significantly heightening the risk of regulatory leakage and amplifying the complexities arising from data gaps. Basing CRE BBMs on firm-level metrics (e.g. ICR, or DSCR, or leverage ratio) as opposed to loan-level metrics could be a simple solution to this issue. CRE BBMs could limit the provision of credit by regulated financial entities to relevant CRE firms exceeding these thresholds at the aggregate balance sheet level. While firms could still obtain additional credit from non-regulated or non-European sources, the loss of access to financing from regulated financial entities should act as a disincentive to do so. The use of firm-level metrics also broadly reflects existing market practice for limiting lending to highly leveraged firms and would limit the need for new data collections, thus reducing the cost and complexity of implementation. Leakages would need to be monitored carefully to ensure the continued effectiveness of the framework. To avoid cross-border leakages, establishing consistent cross-country definitions for key lending metrics could facilitate the reciprocation of measures across countries and enhance cross-country risk assessment.

Given the varying significance, heterogeneity and complexity of CRE markets across countries, it would be essential to grant the national authorities of Member States primary responsibility for calibrating and activating any CRE BBM within their respective jurisdictions. As a result, they would have discretion in defining the scope of lending to be covered by these measures, including the need to identify the

relevant CRE firms subject to the regulation and the scope of financial institutions bound by the BBMs. To ensure proportionality, a predefined threshold could be applied by the national authorities if warranted to the exposures on which CRE BBMs are applied. Additionally, the framework should allow for potential deviations from the prescribed limits, where justified, subject to a “comply or explain” requirement designed to maintain transparency and accountability.

The paper also aligns with the ESRB Recommendation to the European Commission ESRB/2022/9 D, which calls for activity-based macroprudential tools to address CRE vulnerabilities and prevent regulatory arbitrage.

The following sections discuss why BBMs would be useful for CRE lending (Section 1), describe who provides CRE lending (Section 2), propose which types of CRE lending could be addressed by BBMs (Section 3), suggest a method and metrics for BBMs in CRE lending (in Section 4), and conclude by outlining the way forward (Section 5).

1 Why BBMs for CRE?

The rationale for introducing BBMs in the CRE sector rests on three key considerations: the financial stability risks stemming from CRE lending, the key role played by CRE lending practices in this regard, and how CRE BBMs could help mitigate these risks.

Financial stability risks related to CRE lending

The vulnerabilities of the CRE sector have to do with both cyclical and structural factors, which have significant implications for financial stability given the sector's size, leverage and interconnectedness with the financial system and the real economy. The ESRB's 2023 report on vulnerabilities in the EEA commercial real estate sector identified that sector as being particularly susceptible to cyclical developments, including the tightening of monetary policy. This finding has been consistently reiterated in subsequent risk assessments.[1] Furthermore, the sector is highly sensitive to macroeconomic conditions and shifts in investor risk appetite. Aside from cyclical risks, the CRE sector faces several structural challenges, including the impact of climate change and climate-related policies, the shift towards e-commerce and structural changes in demand for office space. However, uncertainty remains regarding the extent to which these trends will affect the long-term financial resilience and strength of the CRE sector.

Risks originating in the CRE sector can spill over into the real economy. Losses incurred by financial institutions exposed to the CRE sector may lead to tighter credit conditions and a reduction in available credit, thus dampening investment and economic activity. These transmission channels are particularly relevant in certain EEA countries where exposures among financial institutions (banks, investment funds, insurance companies and pension funds) to the CRE sector account for a substantial share of GDP. This is especially critical when CRE exposures make up a significant portion of the assets held by financial institutions. The pronounced cyclicality of the CRE sector from both an income and a balance sheet perspective, combined with its high leverage, has historically contributed to, or exacerbated, financial crises and episodes of financial instability.

CRE lending practices

In January 2023, the ESRB issued Recommendation ESRB/2022/9 **on vulnerabilities in the CRE sector, which focuses on credit risk related to CRE financing.** For credit institutions, the recommendation identified several risk factors, including high loan-to-value (LTV) ratios, which increase loss-given-default (LGD) for financial institutions. Moreover, the prevalence of bullet repayment schemes, non-recourse structures, or a combination of long maturities with the absence of

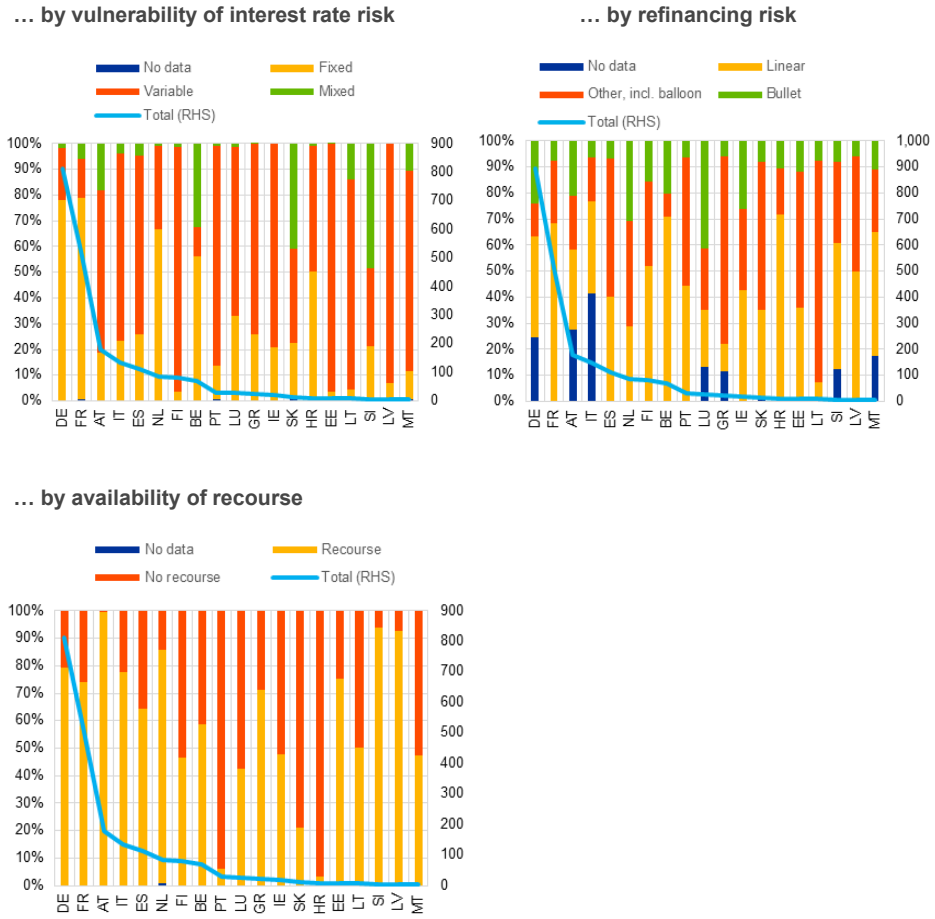
[1] See for example ECB (2024) Financial Stability Review, November 2024; EBA (2024) Risk Assessment Report, July 2024; ESMA (2024) Report on trends, risks and vulnerabilities, January 2024; EIOPA (2024) Financial Stability Report, June 2024; Finansinspektionen (2023) Stability In The Financial System (2023:1), May 2023; Berg, T., R. Haselmann and T. Kick (2024), Unintended consequences of QE: Real estate prices and financial stability, presented at the 10th ECB research conference in September 2025.

amortisation plans could be significant in certain cases (see **Figure 1**). Furthermore, the ESRB noted that the debt-servicing capacity of some borrowers may be less robust than initially assumed by financial institutions. Importantly, these vulnerabilities can also arise in the case of lending provided by non-bank financial institutions. Refinancing risks are a key concern in the presence of bullet loans, as many banks rely heavily on the value of the property when determining the borrower's refinancing ability. However, the value of the property can fall sharply during market downturns.

Figure 1

Breakdown of bank CRE exposures by different sources of risk

(percentage of total outstanding nominal amount (LHS), EUR billion (RHS), Q1 2025)



Source: AnaCredit

Notes: There is some uncertainty regarding the reliability of AnaCredit reporting across certain banks and jurisdictions, as well as potential inconsistencies in the definitions used. CRE exposures are defined as exposures with the purpose of "CRE purchase", "RRE purchase" or "construction investment" or those secured by "CRE collateral", "RRE collateral" or "offices and commercial premises". "RRE purchase" qualifies as CRE, according to the ESRB definition, as the property is owned by a non-financial corporation (NFC) rather than a household (see ESRB 2019, *Recommendation on closing real estate data gaps*). Data on amortisation are shown for loans issued after 2018 due to a reporting waiver for older loans. Some banks are unable to reliably report information on recourse financing. Data presented by the country of the debtor.

Recommendation ESRB/2022/9 further highlights the need to assess the feasibility of BBMs for CRE at the EU level and underscores the importance of promoting sound CRE financing practices.[2] In this context, prudent CRE financing should include an assessment of the borrower's debt servicing capacity, which should be based on the expected income generated either by the CRE property or, in case of owner-occupied properties, by the underlying business activity. Collateral valuation should be conducted prudently,[3] taking due account of differences between individual CRE sub-sectors and segments. The Recommendation also urges relevant authorities to weigh up the merits of implementing BBMs for CRE, where such tools are available under their national frameworks. Additionally, it calls on the European Commission to review the EU's current macroprudential framework and to ensure consistent rules for addressing risks associated with CRE exposures across all financial institutions engaged in similar activities. Such an approach should consider the specific characteristics and risk profiles of these institutions. Where necessary, the Commission is encouraged to propose EU-level legislation to complement existing entity-specific macroprudential tools with activity-based tools, thereby enhancing the ability to address vulnerabilities in the CRE sector while mitigating the risk of regulatory arbitrage and the shifting of risks between banking and non-banking sectors.[4] Such legislation would also help to prevent policy inaction.

While capital-based and other macroprudential measures are available to EEA countries through national or Union law, there is no broad European framework for CRE BBMs (and RRE BBMs) . To address this shortcoming, the ESRB has called for the establishment of an EU-wide framework for activity-based regulation of residential real estate loans. It also argues that BBMs for non-corporate loans should be available across all countries.[5] Additionally, in its response to the European Commission's call for advice on the adequacy of the macroprudential framework for non-bank financial institutions, the ESRB proposes the introduction of activity-based BBMs into EU law for lending to households and to NFCs. In this document, the ESRB emphasises that the calibration and activation of such instruments should remain the responsibility of national competent authorities (NCAs).[6]

The financial stability consequences of the materialisation of CRE risks can vary significantly, depending on the proportion of debt to equity funding within this sector and the types of financial institutions that provide debt financing to CRE firms. Corporate and insolvency laws generally assume that losses incurred by

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2 Under Recommendation C(5) and D of Recommendation ESRB/2022/9.

3 See also Article 229 of the Capital Requirements Regulation (CRR) on the valuation principles for other eligible collateral under the IRB approach, as well as Box 5 of this note.

4 The Commission is requested, by 31 December 2026, to submit to the European Parliament, the Council and to the ESRB a report on any actions taken with regard to Recommendation D.

5 See, for example, ESRB (2023) *Vulnerabilities in the EEA commercial real estate sector*; ESRB (2022), *Review of the EU Macroprudential Framework for the Banking Sector*; ESRB (2021), *Lower for longer – macroprudential policy issues arising from the low interest rate environment*, and ESRB (2019), *Macroprudential approaches to non-performing loans*.

6 See Section 4, Chapter 5 of ESRB (2024*), A system-wide approach to macroprudential policy – ESRB response to the European Commission's consultation on assessing the adequacy of macroprudential policies for non-bank financial intermediation*, November.

a corporation[7] are initially absorbed by equity and subsequently by mezzanine (subordinated) liabilities. Therefore, credit risk associated with the debt financing of a corporation depends on the proportion of subordinated liabilities relative to the debt. For secured financing, credit losses borne by the lender could be reduced by the proceeds obtained by selling the underlying collateral. By contrast, if an institution financing the CRE asset bears an actual, or a mark-to-market, loss on its CRE debt, its capacity to absorb such loss will depend on its business model. For instance, unleveraged closed-end investment funds (whose liabilities consist solely of equity) would absorb valuation declines in CRE-related financial assets (i.e. loans granted or debt purchased) through reductions in the value of their investors' unit shares, while losses in open-end funds might trigger a fire-selling spiral and generate contagion risk for the wider financial system. Meanwhile, for banks, a decline in the value of a CRE asset serving as collateral for a loan to a CRE firm could result in a higher LGD, particularly if the loan is not overcollateralised. Loans to firms heavily involved in CRE development, or whose business model is predominantly driven by returns on income-producing CRE assets, may be exposed to a greater risk of higher LGD and PD, potentially triggering reclassifications of the loans and higher provisions during a CRE market downturn. The CRE sector's vulnerability is further reflected in its comparatively higher levels of non-performing loans (NPLs) relative to other sectors of the economy.[8]

Loose credit conditions and excessive risk-taking driven by optimistic expectations can lead to unsustainable CRE lending booms across all types of financial institutions and give rise to systemic risk, regardless of the type of lender. Consequently, an activity-based approach to CRE lending could be seen as the most appropriate means of addressing risks related to CRE financing. While more complex to implement, such an approach targets vulnerabilities regardless of the type of institution involved, minimises regulatory leakage, and could be justified, as explained above, where the principles of proportionality and the outcomes of the materiality assessment warrant this approach.

The cyclicality and vulnerability of the sector underscore the need for policy measures aimed at curbing excessive risk-taking through higher leverage. Such measures would also indirectly make lenders more resilient by improving the risk profile of their exposures and collateral. In the aforementioned call for advice, the first step proposed by the ESRB was to introduce activity-based regulation into EU law to enable national authorities to implement BBMs for RRE loans. The ESRB suggests, as a second step, analysing the feasibility of extending the framework to BBMs for loans to NFCs, including CRE loans. As a final step, it proposed studying the feasibility of covering market-based finance through bond issuance to prevent the circumvention of loan-based measures. The ESRB also expressed its readiness to support the development and application of BBMs for CRE loans and other loans to NFCs in its concept note.[9]

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7 Including those arising from CRE-related exposures.

8 See, for example, EBA Data Annex Interactive, Q4 2024.

9 See ESRB concept note titled *Review of the EU Macroprudential Framework for the Banking Sector*, March 2022.

Effect of BBMs on CRE lending

Macroprudential BBMs for CRE have the potential to mitigate excessive credit growth that could amplify CRE boom periods. These measures can also be effective in limiting the financial system's exposure to high-risk and highly leveraged CRE firms and prevent an unwarranted loosening of credit standards during such periods (leading to heightened counterparty risk).[10] By achieving these objectives, BBMs would contribute to the overarching aim of macroprudential policy: safeguarding the stability of the financial system. While (legacy) stock risks related to existing exposures to highly leveraged CRE firms can be addressed through capital-based measures, BBMs for CRE could target flow risks by curbing excessive credit growth. In practical terms, CRE BBMs could be operationalised in the form of macroprudential supervisory expectations akin to "risk appetite" frameworks. Such expectations would focus on ensuring a composition of CRE debt financing portfolios among financial institutions that is compatible with sustainable market developments, for example by limiting the proportion of exposures to highly leveraged CRE firms. Alternatively, BBMs could take the form of direct constraints on new CRE debt financing, such as limits on the proportion of new loans that can be extended to highly leveraged CRE firms. Conceptually, BBMs can be applied as activity-based measures, which would allow them to encompass lending activities by both banks and non-bank financial institutions.

BBMs have already demonstrated their effectiveness in mitigating credit risks associated with RRE, thus making them a promising tool for addressing similar risks in the CRE sector.[11] Evidence from the RRE market indicates that BBMs can successfully constrain credit growth, influence credit standards, and reduce the proportion of riskier loans. By imposing restrictions on the amount of lending relative to a borrower's income or to the value of the collateral provided, BBMs can be effective in reducing both the probability of default (PD) and the loss-given default (LGD) for specific exposures.[12] Lower credit risk, in turn, enhances the soundness of financial institutions' loan books and makes borrowers and lenders alike more resilient to adverse shocks, such as deteriorating economic conditions or

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10 See also Valderrama, L. (2023), "Calibrating Macroprudential Policies in Europe Amid Rising Housing Market Vulnerability", IMF WP/23/75.

11 See ESRB report titled *Vulnerabilities in the EEA commercial real estate sector*, January 2023.

12 See Cerutti, E., Claessens, S. and Laeven, L. (2017), "The Use and Effectiveness of Macroprudential Policies: New Evidence", *Journal of Financial Stability*, Vol. 28(C), pp. 203-224; Alam, Z., Alter, A., Eiseman, J., Gelos, G., Kang, H., Narita, M., Nier, E. and Wang, N. (2019), "Digging Deeper–Evidence on the Effects of Macroprudential Policies from a New Database", *IMF Working Paper* No 2019/066, International Monetary Fund; Araujo, J., Patnam, M., Popescu, A., Valencia, F. and Yao, W. (2020), "Effects of Macroprudential Policy: Evidence from Over 6,000 Estimates", *IMF Working Paper* No 2020/067, International Monetary Fund; Poghosyan, T. (2019), "How Effective is Macroprudential Policy? Evidence from Lending Restriction Measures in EU Countries", *IMF Working Paper* No 2019/045, International Monetary Fund; Jelena Ćirjaković (2018), "Macroprudential instruments and the commercial real estate market", June, *Banka Slovenije Working Papers*; Malovaná, S., Hodula, M., Gric, Z. and Bajzík, J. (2024), "Borrower-based macroprudential measures and credit growth: How biased is the existing literature?", *Journal of Economic Surveys*, 6 January, https://doi.org/10.1111/joes.12608.

falling CRE prices.[13] Moreover, BBMs help to curb credit growth and improve portfolio risk profiles by smoothing credit demand over the financial cycle. This, in turn, reduces the likelihood of sharp asset price increases and the build-up of imbalances.[14] BBMs can also address risks and vulnerabilities across multiple stretches simultaneously, including collateral, income and activity, and financing stretch during periods of strong market expansion.[15] While there is limited empirical evidence on the relationship between lending standards and credit default risk, several emerging studies have provided valuable insights. For instance, Mokas and Nijskens (2019) identify a correlation between higher credit risk and LTV ratios for the Netherlands. Similarly, Ciocchetta et al. (2025) find significant relationships between credit risk and LTV ratios in Italy and Spain, though not in Germany and France. Fernández Lafuerza and Galán (2024) more broadly demonstrate that corporate credit default risk can be reduced by imposing limits on leverage and debt burdens among companies.[16]

Pre-emptively activating BBMs at an early stage of the real estate cycle can help limit the build-up of vulnerabilities. By targeting the riskiest segment of new lending, BBMs can provide a structural backstop against the emergence of an unsustainable credit boom and gradually improve the risk characteristics of the stock of outstanding loans. This approach can (i) reduce the need for additional measures later in the cycle (substitution perspective), or (ii) complement capital-based measures introduced to bolster resilience against accumulated vulnerabilities in the stock of exposures (complementarity perspective).

BBMs can be effective as a structural measure by anchoring or tightening minimum credit standards, thereby mitigating the risk of a future deterioration in asset quality among financial institutions. BBMs can also be relaxed during downturns in the financial cycle to support lending, given that financial institutions typically tighten their credit standards during such periods.[17] However, such a cyclical recalibration/(de-)activation carries the risk, and ensuing costs, of taking

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13 See Gross, M. and Población, J. (2017), "Assessing the Efficacy of Borrower-Based Macroprudential Policy Using an Integrated Micro-Macro Model for European Households", Economic Modelling, Vol. 61, pp. 510-528; Ampudia, M., Lo Duca, M., Farkas, M., Pérez-Quirós, G., Pirovano, M., Rünstler, G. and Tereanu, E. (2021), "On the Effectiveness of Macroprudential Policy", *ECB Working Paper*, No 2559, European Central Bank; Giannoulakis, S., Forletta, M., Gross, M. and Tereanu, E. (2023), "The effectiveness of borrower-based macroprudential policies: a cross-country analysis using an integrated micro-macro simulation model", *ECB Working Paper*, No 2795, European Central Bank.

14 See Dirma, M. and Karmelavičius, J., "Micro-Assessment of Macroprudential Borrower-Based Measures in Lithuania, *IMF Working Paper*, No 2023/227.

15 See, for example, ESRB (2019), *Methodologies for the assessment of real estate vulnerabilities and macroprudential policies: commercial real estate*, report. The transmission mechanisms for the BBMs over the different stretches of the risk analysis framework, as well as the relationships between CRE risks and vulnerabilities, policy objectives and policy instruments, are presented in ESRB (2018), *Report on vulnerabilities in the EU commercial real estate sector*, November.

16 See Ciocchetta, F., Pico, R. and Quaglia, I. (2025), "Commercial real estate loans in Europe: does the loan-to-value at origination predict credit default risk?" *Banca d'Italia Occasional Papers*, No 905; Mokas, D. and Nijskens, R. (2019), "Credit Risk in Commercial Real Estate Bank Loans: The Role of Idiosyncratic versus Macro-Economic Factors", *De Nederlandsche Bank Working Paper*, No 653; Fernández Lafuerza, L. and Galán, J.E. (2019), "Should borrower-based measures target corporate lending? Evidence from credit standards and defaults", *SUERF Policy Brief*, No 948.

17 See, for example,, Tereanu, E. et. al (2022), "The transmission and effectiveness of macroprudential policies for residential real estate", *ECB Macroprudential Bulletin*.

action at the wrong time, as the relevant data used for calibration are released with a time lag, which impedes a forward-looking orientation of macroprudential policy.

Drawing inspiration from past experience

Macroprudential BBMs for the CRE sector could draw inspiration from existing microprudential regulations at both the EEA and domestic levels, as well as international experience. At the EEA level, the 2020 EBA Guidelines on loan origination and monitoring[18] outline specific metrics relevant for real estate credit granting, including, inter alia, LTV and the debt service coverage ratio (DSCR) for CRE activities. Furthermore, the ECB guidelines on leveraged transactions set out supervisory expectations for loan or credit exposures[19] where the borrower's post-financing leverage, on a consolidated basis, exceeds a total debt-to-EBITDA ratio of four. While the ECB Guidelines do not apply directly to real estate lending, credit institutions are nonetheless encouraged to extend these supervisory expectations to other types of transactions where relevant.

Several EU Member States have already implemented microprudential BBMs targeting CRE exposures among banks. For instance, the Danish Financial Supervisory Authority (FSA) has issued Guidelines on the financing of rental real estate and real estate projects[20], which set limits on LTV ratios, DSCRs, interest coverage ratios (ICR) and borrower solvency (equity/assets ratio) (see Box 1).[21] Similarly, the Polish FSA's Recommendation S concerning good practices related to mortgage-secured credit exposures sets LTV limits for both RRE and CRE loan origination. In addition, Cyprus has introduced LTV limits for CRE loans.[22] Large exposure limits can also help reduce financial stability risks related to lending. Under the CRR/CRD framework, these limits require banks to limit their exposure to a single client or group of connected clients[23] to 25% of the bank's eligible capital (Tier 1). However, this measure applies only to the banking sector and does not prevent a CRE entity from borrowing from several financial institutions. Large exposures to highly leveraged firms can also be addressed through a sectoral systemic risk buffer (SyRB), by applying higher risk weights to banks with such large exposures under Article 458 of the CRR, or by requiring that such exposures do not

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18 EBA Guidelines relate inter alia to the assessment of the income-generating capacity of the property and an assessment of the prospect of refinancing at maturity of the loan. In case of interest-only loans, banks should assess whether the CRE asset would generate sufficient cash flow to support a level of amortisation equivalent to the projected economic life cycle of the property or to repay the principal amount and interest of the loan in the event of an increase in the LTV. They also call on banks to constantly monitor financial covenants specified in loan agreements, e.g. the net debt/EBITDA, interest coverage ratio and debt service coverage ratio. These are usually criteria which are used in financial institutions' financial covenants: obligations of the borrower provided for in the loan agreement, the breach of which may lead to the event of default under the agreement, and – consequently – to the calling of the loan agreement.

19 Irrespective of the classification in the regulatory banking book or regulatory trading book.

20 *Vejledning om finansiering af udlejningsejendomme og ejendomsprojekter*.

21 In Denmark also maturity limits for CRE loans have been activated but rather as a feature of the broader mortgage covered bond framework.

22 See Appendix I; LTV limits on CRE loans were implemented by the national macroprudential authority in Cyprus (rather than the microprudential authority).

23 A group of connected clients refers to entities that are so closely related (i.e. financially or economically interdependent) that financial difficulties affecting one of them would likely also affect the others.

exceed a certain percentage of capital.[24] While such measures make banks more resilient, they do not directly reduce the volume of loans granted to such firms. For non-bank financial institutions, the Undertakings for Collective Investment in Transferable Securities (UCITS) Directive and the Alternative Investment Fund Managers Directive (AIFMD)[25] establish common rules governing lending activities among alternative investment funds (AIF) within the EU. These provisions resemble capital-based measures, as they will, in principle, require asset managers overseeing loan-originating AIFs to retain 5% of the nominal value of each loan originated and subsequently transferred to third parties. This retention requirement aims to mitigate the risk of misaligned incentives.

Box 1
An example of BBMs for CRE lending: Denmark

This box summarises the BBMs for CRE lending set out in the Danish Financial Supervisory Authority (Finanstilsynet) in its *Guidelines on the Financing of Rental Properties and Real Estate Projects* (April 2023). These Guidelines draw on lessons from past financial crises and establish a range of minimum expectations for credit institutions financing income-generating real estate and development projects in Denmark. A part of these expectations applies specifically to financing of commercial real estate.

The Guidelines list, among others, the following ratios: LTV, loan-to-cost (LTC), DSCR, ICR, and leverage. These measures are to be assessed jointly, meaning that weaknesses in some measures can generally be offset by a stronger performance in others. These requirements are applied proportionately: they are stricter for systemically important institutions (SIFIs) and more flexible for small institutions with lower exposures. The banks must either comply with the Guidelines or explain any deviations.

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[24] In 2018, the French High Council for Financial Stability (HCSF) introduced, via Article 458 of the CRR, a concentration limit whereby exposures of systemic French banks to highly leveraged large non-financial corporations (NFCs) could not exceed 5% of the bank's eligible capital. It applied to the largest French banks designated as systemically important. An NFC was classified as highly leveraged if its ultimate parent company had a net leverage ratio (total financial debt less outstanding liquid assets over total equity) exceeding 100% and an interest coverage ratio (earnings before interest and taxes relative to interest expenses) of below three. In 2023, the measure was replaced by a 3% sectoral systemic risk capital buffer (sSyRB) for the exposures of systemically important French banks to heavily indebted large French companies, where such exposures exceed 5% of capital (see Banque de France, *Assessment of Risks to the French Financial System*, June 2023). In line with the sSyRB regulation and EBA guidelines, the sSyRB was applied only to domestic exposures and an NFC was classified as highly indebted if its ultimate parent company had a total debt-to-EBITDA ratio that was negative or greater than six. The capital buffer was deactivated in June 2025, as the measure had failed to make any material contribution in improving the resilience of the French financial system and was also complex to understand and implement. The French authorities will continue to monitor the concentration of exposures of French banks to NFCs.

[25] See Directive (EU) 2024/927 of the European Parliament and of the Council of 13 March 2024 amending Directives 2011/61/EU and 2009/65/EC as regards delegation arrangements, liquidity risk management, supervisory reporting, the provision of depositary and custody services and loan origination by alternative investment funds.

1. LTV: for rental commercial properties, the LTV must not exceed 75%. High LTVs require compensating factors, such as long lease terms or fixed-rate financing.

2. LTC: for CRE development projects, the maximum LTC is 65%.

3. DSCR: the Guidelines define the DSCR as (EBITDA–Tax) / (interest + instalments + fees). While no numeric threshold is specified, the Guidelines underscore the need for a positive net operating cash flow for rental properties. Cash flow must be sufficient to fully cover interest, amortisation, and fees based on fixed-rate, annuity-style amortisation over a 30-year period (20 years for industrial and logistics properties). For real estate projects under development, negative cash flow may be tolerated for up to three years only if the borrower is financially strong and the project assumptions are suitably conservative.

4. ICR: although no specific level of ICR (defined as EBITDA / (Interest + fees)) is prescribed, institutions are expected to assess the ICR and incorporate this into their credit decision-making.

5. Leverage (equity-to-asset ratio): minimum equity ratios must be met based on property type:

– 25-40% for commercial portfolios

– 35-50% for development projects

Asset valuation must be conservative and reflect market values or current mortgage lending assessments.

Globally, several jurisdictions outside Europe have implemented BBMs for CRE loans. For example, China, Hong Kong and Indonesia have all introduced LTV limits, while Singapore and Hong Kong have adopted a debt servicing ratio to curtail risky CRE debt. These measures appear to have played a significant role in mitigating downside risks to CRE price growth, particularly over the near term.[26]

Applying BBMs to the CRE exposures of financial institutions is considerably more complex than doing so in the RRE sector. This complexity arises from, among other factors, the heterogeneity of CRE asset types, business models and forms of financing, all of which give rise to significant differences in risk profiles across CRE exposures, thus influencing the borrower's credit risk. These differences stem from the following factors:

- **Types of physical real estate:** CRE encompasses a wide range of property types, including office buildings, warehouses, hotels and hospitality assets, multi-flat rental properties, industrial property, retail property, undeveloped land, and mixed-use properties. Additionally, the location and quality of these properties – i.e. prime versus non-prime real estate – further differentiate their risk profiles.

[26] See Deghi, A., Mok, J. and Tsuruga, T. (2021), "Commercial Real Estate and Macrofinancial Stability During COVID-19", *IMF Working Paper*, No 2021/264.

- **Cyclicality of the CRE sector:** the income generated by CRE assets, as well as their valuations, is highly cyclical and influenced by macroeconomic conditions and interest rate dynamics. Estimated income also depends on the availability of comparable market data. These factors are particularly pronounced during periods of market illiquidity, further complicating the assessment of credit risk.

- **Types of CRE transactions:** CRE transactions are diverse, ranging from land acquisition, development and construction, through to the purchase of income-producing real estate, and the construction or purchase of owner-occupied properties for business purposes unrelated to CRE operations.

- **Liability structure of the CRE borrower:** CRE projects can be financed through a variety of channels, including bank and non-bank loans, market-based financing such as bond issuance, credit-like instruments such as leasing, mezzanine[27] financing, or equity contributions. These funding sources may involve financial institutions, non-financial institutions, or retail investors (e.g. private individuals),[28] as illustrated in **Figure 2**.

- **Alignment between loan purpose and collateral:** unlike traditional RRE mortgage lending, where the loan is typically secured by the property being purchased, CRE loans often exhibit more complex structures. For instance, loans with a CRE-related purpose may be secured by CRE assets as collateral or may be entirely unsecured, while loans for non-CRE purposes may still use CRE assets as collateral. Additionally, borrowing by CRE firms is not always linked to a specific CRE project.

- **Origins of financing:** financing for CRE transactions may originate from foreign institutions that are not subject to domestic regulatory requirements. Furthermore, it is common for multiple lenders – both secured and unsecured – to finance the same CRE project, further complicating the assessment.

- **Ownership structures:** CRE transactions often involve layered ownership structures, with multiple entities participating in the ownership and development of a project. Such arrangements can make the transaction more opaque.

- **Limited liability of owners:** CRE borrowers frequently operate under limited liability structures, meaning that the credit provider does not have full or direct

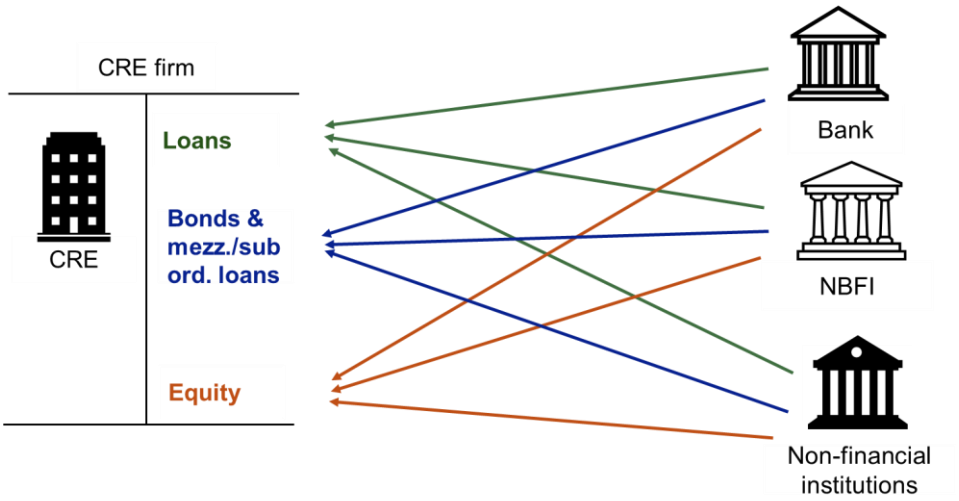
[27] Mezzanine debt is a financing instrument junior to bank loans and senior to equity. In the event of default, mezzanine debt may be converted into an equity interest in the company. It combines features of both debt and equity financing as it sometimes allows lenders to participate in the company's potential upside but is subordinated to other loans.

[28] A range of non-banks have exposure to the CRE market, including publicly listed or private/unlisted REITs, property funds (which can be open-ended or closed-ended), finance companies (other non-bank mortgage lenders), insurers, pension funds, private funds and hedge funds, family offices, high-net worth individuals, and endowments funds; see FSB Vulnerabilities in Non-bank Commercial Real Estate Investors, 2025.

recourse to all sources of income or assets of the borrower, as discussed further in Box 2.[29]

Despite these challenges, it is possible to design CRE BBMs that effectively mitigate risks and achieve their intended objectives. This is explored in greater detail in Sections 3 and 4 below.

Figure 2
Different sources of financing of a CRE firm



Source: ESRB.

Box 2
Hierarchy of lenders and shareholders in CRE financing

In contrast to the relatively straightforward structure of residential mortgage loans – typically involving a single debtor, a single creditor, one loan and one residential property as collateral – financing of CRE is considerably more complex. It frequently involves multiple types of investors and various forms of financing, including equity, loans, bonds and mezzanine instruments. Moreover, the financing is often provided through complex corporate structures, encompassing intragroup financing arrangements or funding from multiple corporations, lenders and financial instruments. Intragroup financing structures may also include off-balance sheet commitments by investors, such as obligations to inject new equity in the event of a deterioration in the borrower's financial position. Consequently, in many

[29] The scale of recourse to various sources of income to service the debt depends on the borrower's legal form and on the particular provisions of the civil code and corporate law in each Member State. In most European jurisdictions, the borrower is fully liable for the debt incurred and all the elements of the financing arrangement (borrower, lender, real estate, loan contract) are typically subject to the domestic law of the same jurisdiction. As the borrower is fully liable for the debt, the lender has recourse to the borrower's income and other assets, subject to appropriate legal proceedings.

instances it is better to assess the debt of CRE firms at a group (consolidated) level, whereas this is not the case in non-recourse financing structures.

In CRE financing, banks often act as the most senior creditors, with their claims typically secured by a mortgage on the financed real estate assets. Where these real estate assets are owned by special purpose vehicles (SPVs), the bank financing is often provided directly to the SPV in question. To mitigate credit risk, such SPV financing is frequently accompanied by subordinated financing, including subordinated shareholder loans (e.g. senior unsecured credit or mezzanine finance) and equity contributions from shareholders.

However, CRE lending is not always secured by real estate collateral. Financial institutions may provide unsecured loans for CRE purposes, such as working capital or general balance sheet financing. Similarly, bonds issued by CRE firms are often structured as senior unsecured claims. Notwithstanding the absence of collateral, loan or bond contracts typically include protection mechanisms beyond security interests. Such protection, often embedded in the contractual terms of the financing instrument, may take the form of loan covenants that trigger risk-mitigating actions by creditors (e.g. calling the loan) or obligations for the debtor to undertake risk-mitigating actions (e.g. injecting additional equity). These contractual protection mechanisms are commonly linked to specific financial metrics, such as limits on overall indebtedness, interest coverage ratios, credit rating thresholds, or limits on the share of encumbered assets.

Given the inherently higher risks associated with CRE lending, senior creditors – whether secured or unsecured – typically require sufficient subordinated liabilities in the creditor hierarchy to protect their claims. These subordinated liabilities predominantly consist of equity and shareholder loans. In addition to traditional financing sources, private equity funds and AIFs specialised in real estate financing also play a significant role in providing mezzanine financing. For instance, real estate funds operating within the alternative asset space have become increasingly reliant on real estate debt financing in recent times. Market intelligence suggests that, in recent years, private credit lenders have shifted their focus from primarily providing mezzanine financing (with banks providing senior tranches) to financing entire CRE projects. This comprehensive financing approach often involves the use of leverage provided by banks, commonly referred to as “back leverage”.[30]

[30] See, for example, Macfarlanes, *Back leverage - a deep dive*.

2 Who provides CRE lending?

While bank loans have traditionally been the primary source of CRE lending[31], alternative forms of lending, such as bond issuance, have grown in significance over time and now account for a larger share of total lending in CRE than in RRE. Recent analysis by the ECB shows that banks are still the main providers of financing of CRE activity within the euro area. Nonetheless, bond financing has become increasingly relevant, particularly among larger firms (Box 3).[32]

Box 3
Who owns and who finances CRE in the euro area? A network approach

Recent ECB analysis by Daly, Ryan and Schwartz Blicke (2024) combines a wide range of data sources to produce the first comprehensive map of the euro area financial system's exposures to CRE. The authors find that the primary owners of CRE are euro area real estate investment funds (REIFs) and euro area real estate companies (RECs), with euro area real estate investment trusts (REITs), euro area insurance companies and pension funds (ICPFs) and international investors (RoW) also playing some role (Chart A, purple lines).[33] However, significant data gaps remain, particularly with regard to private credit activity, so these numbers should still be interpreted as approximations of actual exposures.

Bank lending remains the primary source of credit for owners of euro area CRE, with firms relying more heavily on debt financing than funds (Figure A, red lines). Most bank loans to owners of CRE are extended to RECs and their subsidiaries. While banks' REIF loan book is only one-tenth the size of the REC loan book, loans to REIFs appear to be particularly risky, as their NPL ratios are twice as high as those for loans to RECs (see Bierich et al., 2024). Bank lending to ICPFs for CRE purposes plays only a marginal role. While REIFs also obtain some financing from international lenders, non-euro area lending to RECs and REITs is very difficult to capture. The authors note that ICPFs play a minor role as CRE lenders, while lending by non-banks other than ICPFs is difficult to trace as no data on such lending are available.

[31] CRE lending" is meant as granting/taking loans and purchase of debt securities (bonds and short term funding instruments) for CRE purposes, in accordance with Chapter 5, A system-wide approach to macroprudential policy, ESRB response to the European Commission's consultation assessing the adequacy of macroprudential policies for non-bank financial intermediation, November 2024

[32] Daly P, Ryan E., Schwartz Blicke O. (2024) Mapping the maze: a system-wide analysis of commercial real estate exposures and risks, ECB Macroprudential Bulletin 25

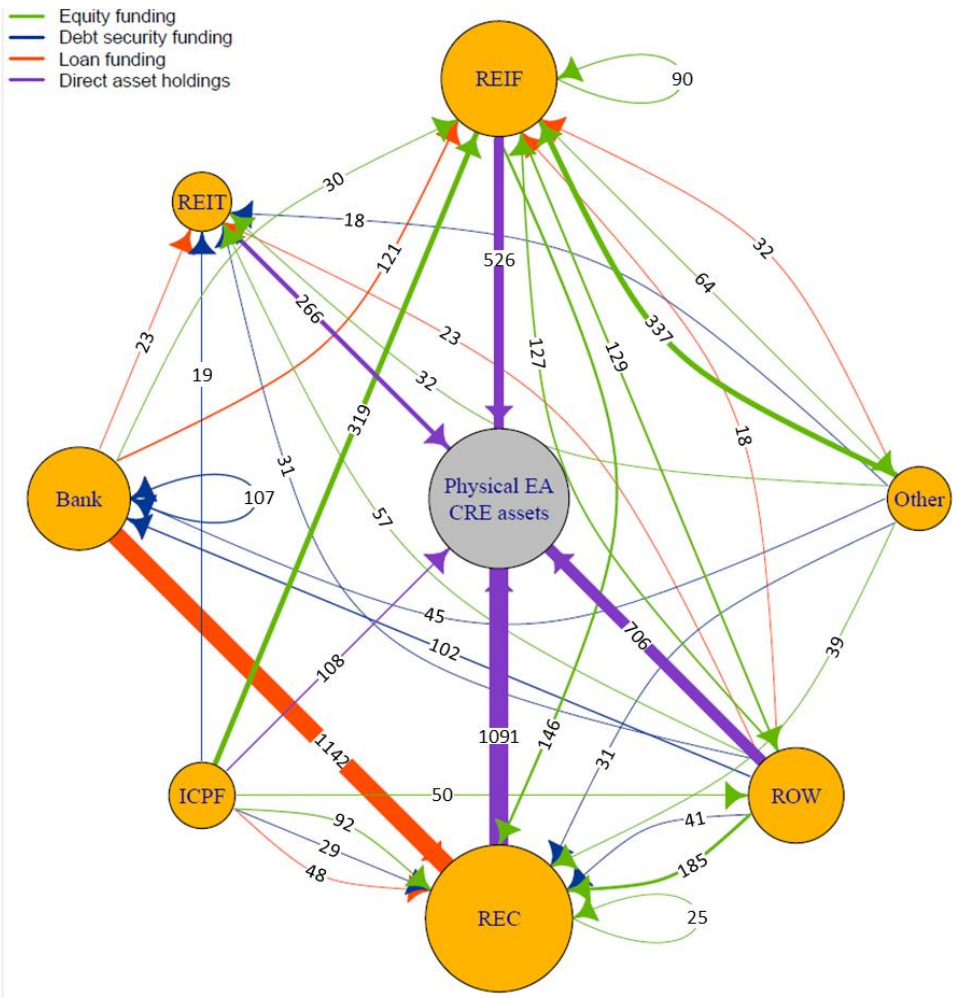
[33] Note that REIFs and ICPFs are financial agents, while RECs and REITs are non-financial agents. The only difference between REITs and RECs is that the former are subject to a REIT legal regime that exists in many countries. RoW comprises both financial and non-financial agents.

Bond financing is also an important source of credit for certain segments of the CRE market – primarily larger firms and REITs (Figure A – blue lines). Total outstanding bonds issued by RECs are only a fraction of the size of total outstanding loans to these companies. However, bond financing is heavily concentrated among the sector's largest firms. Indeed, among REITs, which are typically larger than an average unlisted REC, total outstanding bonds are similar in size to total outstanding loans. This suggests that leakages from bank-loan-based BBMs via bond financing would be particularly pronounced in economies with larger and more financially sophisticated firms.[34]

Figure A

Network of cross-sectoral CRE exposures and interconnectedness by instrument in the euro area

(nodes: size of sectoral CRE exposures (EUR billions); edges: size of links by instrument type (EUR billions))



Source: Daly, Ryan and Schwartz Blicke (2024).
Notes: This analysis defines CRE exposures as exposures of and to real estate companies unlike the analysis provided in Figure 1, which examines bank loans with a CRE purpose/CRE collateral. Figure A focuses on real estate companies, as this is the easiest way to identify bond financing of CRE (where bonds typically have neither collateral nor a defined purpose).

[34] Only a minor share of CRE-related bond financing is secured. Most CRE-related bonds are unsecured, with the remainder largely comprising bond instruments (such as commercial mortgage-backed securities (CMBS) and covered bonds) where the collateral consists of CRE loan books as opposed to individual CRE properties.

Equity financing in the form of fund units and company shares also plays an important role in financing euro area CRE (Figure A – green lines). While equity financing should not be covered by BBMs, it is still useful to understand its role in overall market financing.

Overall, this analysis highlights the dominant role played by banks in the provision of CRE financing, while also illustrating the complexity of CRE financing.

Quantifying CRE financing

The total exposures of EU banks to CRE[35] account for a significant share of their overall lending to the non-financial sector, as indicated by the EBA Risk Dashboard. Within the EU, exposures towards NFCs engaged in real estate activities amount to approximately €1.4 trillion[36] (see **Figure 3**). A substantial proportion of this lending is cross-border, thus exposing EU financial institutions to risks stemming from the CRE sector in European and non-European jurisdictions alike. At the end of 2024, more than €100 billion of CRE-related exposures were towards counterparties domiciled outside the EEA, with Dutch, Spanish and German banks reporting the highest of such exposures.[37] The cross-border nature of CRE activity is further illustrated by the significant levels of cross-border borrowing among large CRE companies[38] (see **Figure 4**). Banks also lend to REITs and REIFs, which are not included in the "NFC" category. Box 3 provides estimates for the euro area, indicating that bank exposures to REITs and REIFs are much smaller than those to real estate companies, amounting to €23 billion and €121 billion, respectively.

35 Understood as exposures to sectors defined in NACE sections L (real estate activities) and F (Construction of buildings).

36 This number can vary somewhat, depending on whether only loans collateralised by CRE are included, or whether we also include loans that have CRE as their purpose (as in the case of CRE development firms).

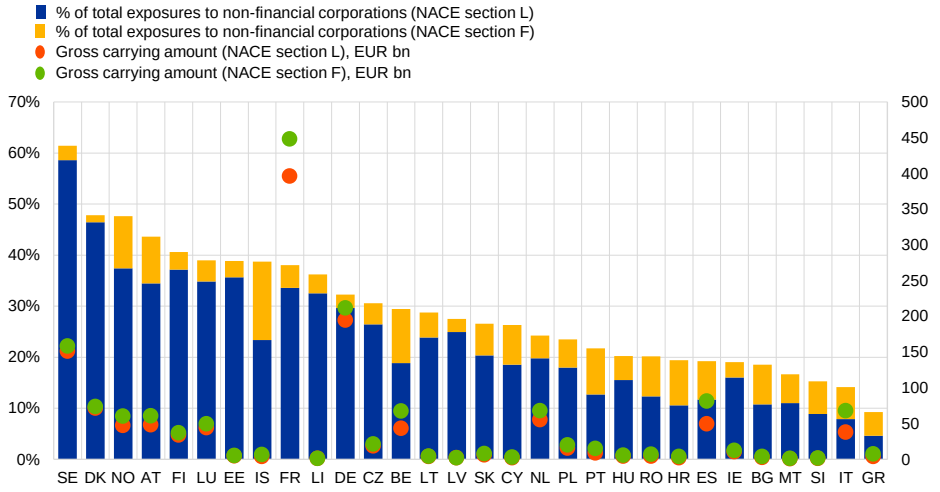
37 See European Banking Authority (2024), *Special topic – CRE-related risks*, July.

38 "Large CRE companies" are defined here as the 100 largest CRE companies in the euro area, including both public and private firms, identified by integrating Orbis and Gleif data on group structures. This yielded approximately 5,600 consolidated companies, with total outstanding bonds issued by these companies amounting to €140 billion (as of June 2024). The list is complemented by data on bank loans from AnaCredit and bonds from CSDB/SHS. Large CRE NFC companies are identified based on total assets, and the following criteria are applied to focus on those firms relevant to financial stability: (i) companies must be privately owned and profit-maximising (i.e. not owned by public sector entities); and (ii) companies must operate as "true" real estate firms (engaged in letting, buying, or developing properties, rather than merely owning property for business operations). Multiple sources, including EPRA, Moody's, S&P Capital IQ, and manual market research, are leveraged to ensure consistency and accuracy.

Figure 3

Total EU bank exposures to NFCs in CRE-related sectors (construction and real estate activities, NACE sections L and F), broken down by country of NFC counterparty

(% of total exposures to NFCs (LHS); gross carrying amount (RHS); Q2 2025)

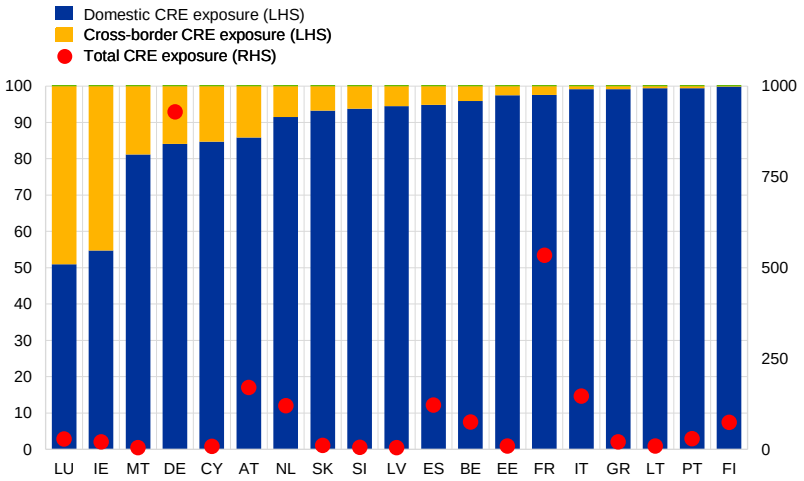


Source: EBA Risk Dashboard.
Notes: A large but hard to quantify share of French firms classified under NACE section L are not proper CRE firms but sociétés civiles immobilières (SCIs). These entities are vehicles used by firms in other sectors to own the real estate they use. For Luxembourg, the outstanding debt according to central balance sheet data from the National Institute of Statistics and Economic Studies (STATEC) amounted to €33.1 billion in 2023, compared with €49.6 billion according to the EBA Risk Dashboard. For Sweden, tenant-owned associations (i.e. cooperatives) are included in NACE segment L, which is not classified as a CRE under the ESRB (or Swedish) definition.
In disclosing aggregate information on real estate exposures, the EBA made use of information in regulatory reporting templates that provide a breakdown of credit exposures. The exposures presented here are a slight overestimation, as strictly speaking some sub-categories would need to be excluded following the definition of Commercial Real Estate (CRE) adopted in the ESRB Recommendation.

Figure 4

Banks' domestic and cross-border CRE exposures as a share of total CRE exposure

(left-hand scale (LHS): domestic and cross-border CRE exposures as a percentage of countries' total CRE exposure; right-hand scale (RHS): total CRE exposures in EUR billions, Q2 2025)



Sources: AnaCredit, ESRB calculations.
Notes: Non-euro area countries are not included in the chart. In the case of Luxembourg, the share of cross-border CRE exposures of domestically oriented banks is considerably lower, amounting to 8% in Q1 2022. For the AnaCredit data, both purpose and protection variables have been considered, as explained in Box 2. Domestic exposures are exposures within the same countries, while cross-border exposures signify exposures to other euro area and non-euro area countries.

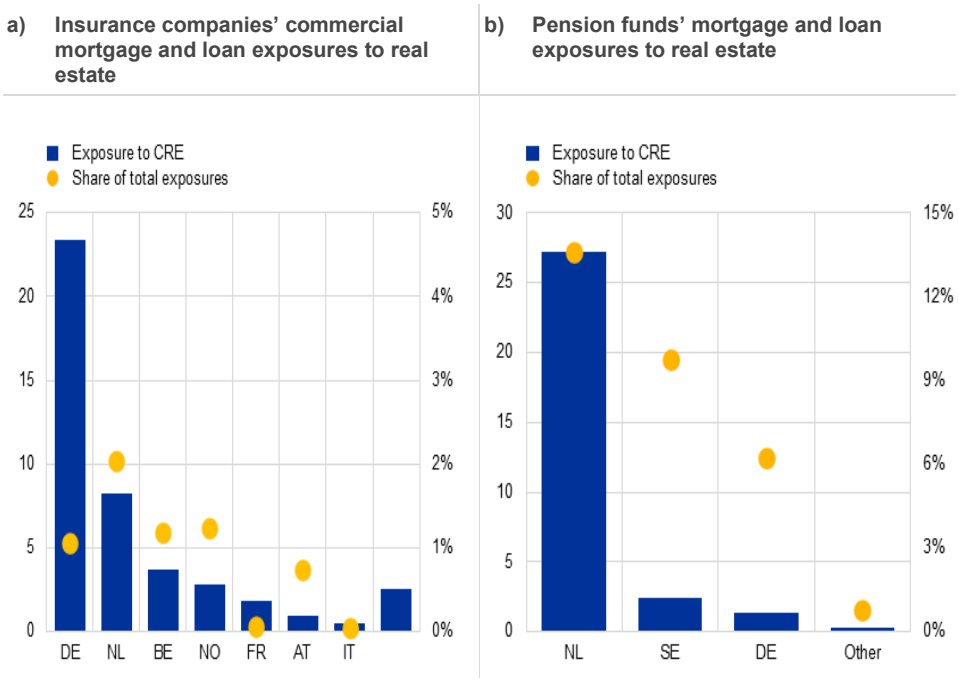
Non-bank financial institutions also play an important role in originating CRE loans. This includes lending by insurance corporations, pension funds,[39] loan-originating funds (LoFs), and direct private lending by finance companies, including financial corporations engaged in lending (FCLs).

In certain jurisdictions, insurers' exposures to CRE loans are particularly significant. According to data from the European Insurance and Occupational Pensions Authority (EIOPA), insurance corporations in the EU reported outstanding commercial mortgage and loan exposures of around €44 billion in the first quarter of 2025, down from €63 billion in the second quarter of 2024. These exposures were predominantly concentrated in insurance corporations based in Germany (see **Figure 5**, panel a). However, these exposures are relatively small as a percentage of the total exposures of insurance corporations, peaking at around 2% in the Netherlands.

Figure 5

Insurance companies' commercial mortgage and loan exposures (LHS) and pension funds' mortgage and loan exposures (RHS) to real estate

(EUR billions; Q4 2024)



Sources: EIOPA Insurance statistics.

Pension funds also hold real estate loan exposures, which amounted to €31 billion across the EU as of the first quarter of 2025 (see **Figure 5**

Insurance companies' commercial mortgage and loan exposures (LHS) and pension funds' mortgage and loan exposures (RHS) to real estate These loan exposures are primarily concentrated in Dutch pension funds, with Swedish and German pension funds also holding relatively large CRE loan portfolios. In the Netherlands, CRE

[39] Insurance corporations and pension funds also directly originate loans to CRE firms, in addition to possible more indirect forms of lending through securitised loans or securities issued by CRE firms.

exposures represent 14% of total pension fund exposures, while in Sweden and Germany, they amount to 10% and 6%, respectively.

In many European jurisdictions, AIFs[40] also originate loans. While some of the loans issued by AIFs are likely directed toward CRE lending, owing to data constraints it is not possible to precisely quantify the size of this activity. As of the fourth quarter of 2023, the net asset value (NAV) of loan-originating AIFs amounted to €406 billion,[41] with the majority of these funds domiciled in Luxembourg and Ireland. This total NAV of €406 billion could be viewed as an upper bound for the potential size of CRE loans issued by AIFs.[42] LoFs are a small but rapidly growing category of financial intermediaries in Europe. While LoFs are often structured as AIFs, in some cases they operate outside regulatory frameworks.[43] In addition to direct CRE lending by LoFs, other types of investment funds contribute indirectly to the CRE debt financing, including loan-participating funds (which acquire existing loans) and private debt funds specialising in real estate.[44]

Some jurisdictions report the presence of direct private lending by other non-bank financial institutions (NBFIs), such as finance companies. These entities often specialise in specific sectors or product lines, including financial corporations engaged in lending (FCLs).[45] For instance, in Sweden, FCLs were largely to blame for the commercial property crisis of the early 1990s,[46] during which time these entities were heavily leveraged and banks had substantial exposures to them. Such lending activity could give rise to regulatory leakages if BBMs for CRE are applied exclusively to supervised entities. However, detailed data on these activities remain scarce, making it harder to assess their role and relative share in the CRE lending

[40] Alternative Investment Funds. In the EU investment funds can either be UCITS or AIFs. Only AIFs can invest in RE directly, while UCITS can invest in RE assets indirectly, e.g., through holdings of equity instruments, including shares of other investment funds. AIFs account for the large majority of RE funds in EU.

[41] Since loan-originating AIFs are not a defined category under the AIFMD, a sample of AIFs with large exposures to loans (where loans accounted for more than 50% of the fund's long exposures) are used as a proxy. This approximation is inspired on the definition of "loan-originating AIF" provided in the recently reviewed AIFMD. According to the revised AIFMD, "loan-originating AIF" means an AIF: (i) whose investment strategy is mainly to originate loans; or (ii) where the notional value of the AIF's originated loans represents at least 50% of its net asset value. See Confirmation of the final compromise text with a view to agreement. A potential limitation associated with this approximation is the inability to distinguish between the activities of loan origination and loan participation in AIFMD data on exposures. Thus, both activities are considered together.

[42] Two important caveats apply here: (i) it is not possible to distinguish between loan origination and loan participation using AIFMD data; (ii) loan funds are not reported as a separate type of fund under AIFMD and so, to approximate the size of the market, we define loan funds as AIFs where loans account for more than 50% of the fund's long exposures.

[43] See *Private debt fund survey 2024* by KPMG/ALFI, pp. 8-10. A BCL analysis (BCL 2019) estimated real estate lending by LoFs in Luxembourg at €12.7 billion at end-2018.

[44] In 2024, approximately 9% of the total private debt fund sector in Luxembourg was related to real estate. The total assets under management (AuM) of the private debt fund sector in Luxembourg amounted to €510 billion as of December 2023 (see *Private debt fund survey 2024* by KPMG and ALFI), and AuM grew by a further 24.7% on average by December 2024 (see *Private Debt Fund Survey 2025* by KPMG and ALFI, p. 4). Of the resulting total, 50% relates to debt-originating funds, while a further 2% engage in both debt origination and debt participation.

[45] See Gaffney, E., Hennessy, C. and McCann, F., "Non-bank mortgage lending in Ireland: recent developments and macroprudential considerations", Vol. 2022, No 3; see also IMF (2023), *Global Financial Stability Report*, Chapter 2, April.

[46] See Finansinspektionen (2019), The Commercial Real Estate Market and Financial Stability, 28 May.

market.[47] As of end-2022, the total assets held by FCLs in the euro area amounted to €529.5 billion, of which €364 billion represented loan claims against non-MFIs. However, the precise share of these loans attributable to CRE lending remains unknown.[48] This lack of granular data on the size and significance of FCLs makes it difficult to fully assess their potential risk to financial stability.

Beyond bank loans, bonds represent the second-largest source of financing for the CRE sector. As of October 2023, CRE financing arranged through bonds was worth an estimated €0.5 to 1.0 trillion.[49] It is important to note that such bonds are not necessarily directly linked to CRE investment; they may have been issued for broader corporate purposes by CRE firms engaged in acquisition, development and construction (ADC) and income-producing real estate (IPRE) activities. Corporate bond issuance by NFCs operating in the CRE sector increased sharply in 2021, but subsequently declined to levels observed between 2018 and 2020. Between October 2023 and end-2026, more than €110 billion in outstanding real estate bonds is expected to mature.[50]

Financing through bonds, as well as direct lending by NBFIs and private individuals, can act as a substitute for CRE bank loans. Consequently, these financing channels should not be excluded from conceptual discussions surrounding potential BBMs for CRE, as this could give rise to regulatory arbitrage. The implications of these alternative financing channels for the design of CRE BBMs will be further explored in the next section.

47 For example, the Central Bank of Ireland has documented the prominent role played by non-bank lenders in the Irish SME funding ecosystem and in the Irish property market in funding real estate development. In 2020, Irish RE SMEs received the largest share (41%) of their borrowing from non-banks, with the real estate being the heaviest borrowing sector from non-bank lenders, both in nominal terms and as a share of sectoral borrowing. See Heffernan, T., McCarthy, B., McElligott, R. and Scollard, C. (2021), *The role of non-bank lenders in financing Irish SMEs*, April; and Gaffney, E. and McGeever, N., "The SME-lender relationship network in Ireland", *Financial Stability Note*, Vol. 2022, No 14.

48 See EU Non-bank Financial Intermediation Risk Monitor, July 2022. More recent data on FCLs are not available, as the reporting was discontinued; see EU Non-bank Financial Intermediation Risk Monitor 2024, June 2024, p. 61.

49 The range reflects differences in the definition of NFCs engaged in CRE activity: the lower bound relates to firms classified as CRE-related NFCs only in months in which they hold a CRE-related loan, according to AnaCredit data, while the upper bound relates to those NFCs that held a CRE-related loan at any time, again according to AnaCredit data.

50 See ESMA (2024), "Real estate markets – Risk exposures in EU securities markets and investment funds", *ESMA TRV Risk Analysis*, 10 January.

3 Which types of CRE lending could be addressed by BBMs?

To effectively determine which CRE lending activities could be addressed by BBMs, it is first necessary to define CRE lending and identify the types of borrowers that should fall within the scope of these measures. CRE lending refers to the provision of loans to, or the purchase of debt securities (such as bonds and short-term funding instruments) issued by, CRE firms.[51] From a balance sheet, or firm level, perspective, this encompasses any borrowing undertaken by any entity classified as a CRE firm. The ESRB provides a definition of CRE loans in the context of monitoring real estate sector developments for financial stability purposes. According to this definition, CRE loans are those extended to legal entities for the purpose of acquiring CRE properties, or being secured by such properties.[52] The ESRB's definition of CRE property includes the following categories: (i) income-producing real estate, whether existing or under development, including rental housing; (ii) real estate, whether existing or under construction, used by the property owners to carry out their business, purpose or activity; (iii) real estate not classified as RRE; and (iv) social housing.

Notably, credit registers such as AnaCredit may employ different definitions of CRE loans. For example, under a narrow approach, CRE loans may be identified based on their purpose, while under a broader approach, borrowers operating in two specific sectors, namely real estate activities (NACE section L, excluding real estate agencies) and construction (NACE section F, excluding civil engineering) [53], are classified as CRE borrowers. However, the use of NACE sector classifications presents certain limitations. First of all, these classifications encompass a wide range of companies, some of which fall outside the scope targeted by BBMs. Moreover, certain CRE-related activities may be reported under other NACE codes, resulting in potential under-reporting of CRE lending. Secondly, relying on NACE classifications targets economic sectors rather than individual loans. This can lead to situations where loans unrelated to CRE, such as a loan to a property company for purchasing a car fleet, are classified under section L despite not being a CRE loan. To address these challenges, national authorities may exclude certain exposures from NACE-based definitions or provide more granular specifications regarding which NACE subcategories should be considered. It is also notable that a significant share of

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51 As defined in Chapter 5 of ESRB (2024), *A system-wide approach to macroprudential policy, ESRB response to the European Commission's consultation assessing the adequacy of macroprudential policies for non-bank financial intermediation*, November.

52 See *Recommendation ESRB/2016/14 on closing real estate data gaps*, as subsequently amended by *Recommendation ESRB/2019/3*.

53 NACE L – Real estate activities comprises: (i) Buying and selling of own real estate; (ii) Renting and operating of own or leased real estate; (iii) Real estate activities on a fee or contract basis, including real estate agencies and management of real estate on a fee or contract basis; and NACE F: Construction of buildings; Civil engineering activities; Specialised construction activities (including demolition and site preparation, construction installation activities, roofing etc.); and Building completion and finishing.

CRE-collateralised loans extended to NFCs is used primarily for operational purposes rather than for CRE investment.

CRE lending in the form of bond issuance cannot be identified in the same manner as CRE loans (see Box 4).

- First, while IPRE and ADC exposures are well defined under the Capital Requirements Regulation (CRR), there is no formal definition of a "CRE bond", i.e. a bond issued to finance the acquisition of a CRE property.
- Second, many bonds issued for the acquisition of CRE properties are unsecured, and there is no official dataset that provides information on the purpose or collateral of bonds comparable to the loan-level data available in credit registers.
- Third, only a subset of CRE-related bonds would fall within the public disclosure requirements set out in the EU Prospectus Regulation for securities offered to the public or admitted to trading on a regulated market. This is because the Prospectus Regulation allows for various exemptions from the obligation to prepare a prospectus, including those based on the size of the issuance or other criteria. As a result, not all bonds are accompanied by a detailed disclosure as to their purpose. Even when a prospectus is prepared, the information provided may lack the level of granularity required to classify a bond as a CRE bond.

Ideally, CRE BBMs would be applied to all forms of lending provided to CRE firms, regardless of the source of financing (domestic or international, bank or non-bank) or the form it takes (loan or bond). Such an activity-based approach to CRE BBMs could be justified by the fact that the CRE sector is financed through a wide range of channels. All entities engaged in the provision of CRE lending (i.e. performing the same activity) may contribute to excessive credit risk (i.e. entailing the same risk) and should therefore be subject to consistent regulatory oversight. Under this approach, CRE BBMs would apply broadly, encompassing a wide range of financing activities, including lending provided by financial institutions, non-financial corporations, and private individuals, whether domestic or foreign.

However, implementing such a far-reaching approach would present substantial challenges, as it would fall outside the remit of most national authorities entrusted with applying BBMs and would be exceedingly difficult to operationalise in practice.

National authorities are typically tasked with regulating the activities of supervised financial institutions. Applying BBMs to CRE lending by non-supervised lenders would go beyond the scope of existing macro- and microprudential frameworks. It would also make existing regulations, civil codes, and commercial company laws unnecessarily complex. Nonetheless, such lending could be addressed indirectly, as discussed further in this paper.

The cross-border nature of CRE lending adds further complexity. While BBMs within the EEA could cover cross-border CRE lending provided by EEA supervised

financial institutions through a request for the reciprocity of the measures applied,[54] CRE lending originating from entities outside the EEA is, by definition, outside the direct regulatory perimeter of EEA competent authorities. Such lending could potentially be addressed by macroprudential policy in the lender's home jurisdiction if deemed systemically significant there, but cannot be directly targeted by EEA measures. This regulatory gap complicates the effective enforcement of sound lending practices and prudential supervision.[55]

Certain types of financing could justifiably be excluded from the scope of BBMs for various reasons:

- Securitised assets: BBMs should not apply to assets resulting from securitisation, as these exposures would already have been subject to BBMs at the point of loan origination. Subordinated inter-company loans should also be excluded from the scope of BBMs, given their high loss-absorbing capacities compared with senior debt. Moreover, inter-company loans may result from internal group capital allocation processes where equity is raised at holding/parent company level and then on-lent to subsidiaries. Excluding inter-company loans would also help avoid double-counting of leverage within a corporate group (e.g. when a parent or holding company borrows and then channels the loan to subsidiaries through intra-group lending).

- Low-risk CRE activities: certain CRE activities, such as agricultural CRE or social housing, may not pose significant financial stability risks. Indeed, some jurisdictions have chosen to exclude such exposures when implementing sectoral systemic risk buffers on CRE lending by banks. CRE BBMs could therefore be applied only to "relevant" CRE firms (see Box 4).

- Existing leverage limits: exposures subject to existing leverage limits (for example, for REITs or REIFs)[56] could also be excluded from the scope of BBMs.

- Lending for own-use property may also be excluded, as the associated risks can differ substantially from those of other CRE exposures in certain Member States.[57]

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54 RRE loans typically finance domestic properties. In contrast, foreign loans are more commonly used to purchase domestic RRE in countries such as Luxembourg. Therefore, the Comité du Risque Systémique has requested reciprocity for the LTV measure to ensure that loans taken at foreign banks to purchase RRE in Luxembourg are also covered by the measure.

55 Among other channels, cross-border CRE lending can arise when lenders in EEA countries provide loans to non-EEA CRE entities. In such cases, the BBMs should apply to lending for both domestic and foreign CRE entities. For example, a European bank providing a loan to a US CRE firm could be subject to such BBMs if they were activated. Meanwhile, for a small fraction of total CRE lending in the EEA, lending to domestic CRE entities might be provided by non-EEA lenders (e.g. a European CRE firm may take out a loan from a US bank).

56 For example, in Belgium the law caps the debt ratio of Belgian REITs at 65%, while leverage among EEA REIFs that are AIFs is subject to Article 25 of the AIFMD. UCITS are already subject to concentration limits under Article 52 of the UCITS Directive, while loan-originating AIFs, under Article 15 of the AIFMD, should "implement effective policies, procedures and processes for the granting of loans". AIFs might also have internal investment limits for specific asset classes, which are similar in spirit to internal limits on banks' financial covenants.

57 See Recommendation ESRB/2019/3.

- Equity financing: pure vanilla equity financing would naturally fall outside the scope of BBMs.

- BBMs could be applied exclusively to exposures that exceed a pre-defined threshold expressed as a share of total lending by the financial institution.[58] Authorities may also consider allowing limited deviations from BBM limits,[59] under a "comply or explain" framework. Such flexibility would enable authorities to account for the heterogeneity of risk associated with different types of CRE (e.g. office vs retail, prime vs non-prime) across Member States, as well as variations in the timing of risk materialisation. Furthermore, this flexibility would help mitigate potential adverse effects of BBMs during periods of declining asset prices or heightened market stress, when strict limits could hinder refinancing efforts and amplify the crisis through fire sales.

Box 4
Definition of relevant CRE firms for CRE BBMs

A definition of "relevant CRE firm" is needed in order to determine which entities' borrowing could be subject to CRE BBMs, including borrowing through the issuance of unsecured bonds. A pragmatic approach would be to define a relevant CRE firm as a legal entity for which real estate development (developers of residential or commercial real estate properties) or income-producing real estate assets (either residential or commercial properties) are an essential feature of its business model, and for which the income performance of the CRE assets is a material element of its profitability and debt servicing capacity. These legal entities should comprise not only non-financial corporations (including REITs[60]), but also financial corporations engaged in CRE acquisition financed by borrowing, such as REIFs.

A definition of "relevant CRE firm" should encompass real estate groups regardless of the size of the company and whether they are private or public. BBMs could be applied to loans taken out by, or bonds issued through, SPVs for or on behalf of CRE firms, to account for situations where CRE exposures are built via SPVs or other intermediation chains. However, in line with the proportionality principle, the framework might exclude entities for which CRE activities do not represent a material share of the firm's overall activities, both at the solo and consolidated group level. This materiality might be assessed, for example, based on the weight of CRE-related revenues to the firm's total earnings, borrowings, or assets.

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58 As, for example, in the ECB's Guidelines on leveraged transactions, which do not apply to credit institution exposures of below €5 million.

59 For example, lenders could be allowed to grant new loans that do not comply with the BBMs, provided that such loans do not account for more than a certain percentage of the volume of new CRE loans granted by the lender in a given calendar year.

60 In Belgium, REITs are classified as financial corporations.

It might not be practical to predefine an exhaustive list of relevant CRE firms that issue CRE bonds. Even if a list of large listed CRE firms could be compiled using market information, it would be incomplete and would omit smaller CRE firms. Enriching such a list with banks' CRE borrowers (for example, based on large exposure reporting) or companies classified under specific NACE sections (based on company register data) might lead to a few misclassifications. Moreover, even where credit register data contain information from banks on the purpose and protection of each loan, such data may not be sufficient to identify CRE firms operating within complex real estate groups, where holding companies may not hold any CRE assets or carry out any CRE operational activities of their own, but operate instead through subsidiaries.

Therefore, several criteria might need to be used by national authorities to define CRE firms that should be subject to CRE BBMs.

The framework for CRE BBMs should leave sufficient flexibility for national authorities to define the right scope of lending activities that should be subject to such BBMs. The primary aim is to limit excessive leverage in CRE investment and mitigate potential sources of major losses for financial institutions with financial stability implications. Along these lines, certain elements of the ESRB definition[61] of CRE lending might be excluded from BBMs, such as lending for commercial properties occupied directly by the borrower for running its business (own-use properties such as industrial plants), real estate used for public purposes (in particular, transport, communications, energy, health care, social care, education, science, culture and religion, public administration, environmental protection, state defence and security, and water supply), cooperative housing associations, and public housing.[62] The exclusion of own-use property may be justified, as the risks associated with such real estate may, in some Member States, be considered different from the risks associated with CRE.[63] Further national exemptions may also be needed due to special policy needs, such as public or social (affordable) housing, cooperative housing associations, and refitting for environmental purposes. Without such exemptions, applying BBMs might conflict with other national policies, while being unlikely to contribute to excessive credit growth. Furthermore, the scope of financial institutions to be covered by BBMs should be defined at national level, to respect the principle of proportionality.

61 See Recommendation ESRB/2016/14 on closing real estate data gaps, amended by Recommendation ESRB/2019/3.

62 See, for example, Polish Financial Supervision Authority (2019), *Recommendation S concerning good practices related to mortgage-secured credit exposures*.; and *Notification by the Ministry for Business, Industry and Financial Affairs (Denmark) on Systemic Risk Buffer (SyRB)*.

63 See Recommendation ESRB/2019/3.

4 How could BBMs address CRE lending?

General principles

Existing microprudential guidelines and the experience gained from implementing RRE BBMs suggests that CRE BBMs could encompass one or more of the following instruments:

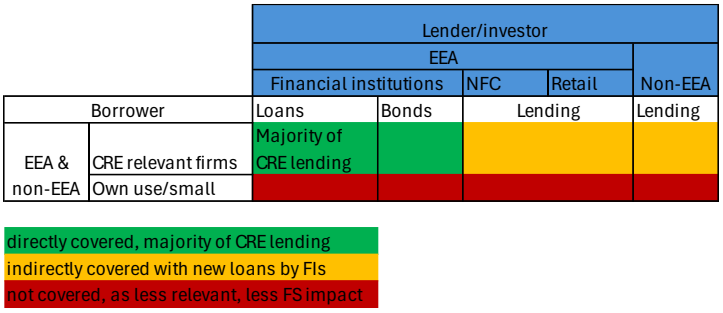
(i) a firm-level income-stretch, implemented through limits on a CRE firm-level ICR or DSCR;

(ii) a firm-level financing stretch, based on the overall indebtedness of relevant CRE firms through limits on balance sheet-based indebtedness ratios;

(iii) a facility-based collateral-stretch, implemented through limits on the LTV of credit facilities that have a CRE property as collateral and where the purpose of the loan is the financing of that specific CRE property.

This paper therefore proposes a feasible and practical solution: BBMs on CRE lending to relevant CRE firms (see Box 4) could be applied directly to loans granted by EEA-supervised domestic financial institutions and to the purchase by such institutions of bonds issued by relevant CRE firms. The BBMs could be applied at the time the loan is taken out or the bond purchased and also on an ongoing basis thereafter, where feasible. Other CRE exposures could be addressed indirectly, as any debt incurred by the firm would be included in the calculation of the BBMs. Limiting the amount of debt financing that can be provided by financial institutions targeted with the CRE BBMs to relevant CRE firms would make it substantially harder for such firms to become highly indebted. In practical terms, national authorities would place a limit on new lending/bond purchases by supervised banks or NBFIs to relevant CRE firms with total indebtedness or debt service capacity above/below a certain threshold. BBMs could be applied indirectly by defining total debt as including all loans granted and bonds purchased by financial institutions, all lending provided by non-supervised entities, and any form of lending provided by non-domestic entities. This would function as a disincentive for firms to increase indebtedness via unregulated channels (i.e. via leakages), as it would ultimately limit their access to lending from regulated financial institutions within the EEA. Such an approach would address the bulk of CRE lending, as shown in **Figure 6**, and should help to ensure that sound credit standards are applied at the time the debt financing is originally provided (flow risk), while also helping to ensure appropriate credit quality of the stock of CRE lending. Cross-border lending can be partially mitigated through reciprocity arrangements.

Figure 6
CRE BBM coverage matrix



Source: ESRB.

The table below outlines these measures, their equivalents in the RRE context, and the advantages and challenges associated with each of them.

Table 1

Proposed measures

Measure	Definition	Equivalent BBM for RRE	Advantages	Challenges
Debt service coverage ratio (DSCR) or interest coverage ratio (ICR)	Borrowers' EBITDA divided by either the sum of total annual debt service obligations (interest and instalment payments) (DSCR) or interest expenses only (ICR). The DSCR equals the interest coverage ratio in the case of non-amortising loans.	Debt service to income (DSTI)	Reduces the PD of a loan. Useful measure of repayment capacity, capable of reacting quickly to changing economic environment/interest rates. Identifies drops in net operating income (NOI). A DSCR limit could differentiate between amortising and non-amortising loans. Firm-level ICR limits are standard loan or bond covenants and therefore this information is normally already available for the financial institutions targeted by the CRE BBMs.	The DSCR (not the ICR) tends to be higher in the case of (riskier) bullet loans than for amortising loans. Limits on DSCR may amplify the effects of tightening/loosening monetary policy on the CRE sector. For the DSCR (not the ICR), differences in amortisation schedules complicate comparisons across transactions and over time. The numerator should consist of the service or interest expense of all debt incurred by the borrowing entity to avoid circumvention (although this seems to be standard practice as loan or debt covenants are usually based on firm-level ICRs).
Indebtedness ratio: Debt-to-EBITDA or Debt-to-equity	Debt incurred by the CRE firm divided by its equity or EBITDA.	Debt-to-income	Reduces the PD on a loan by lowering incentives not to pay back the loan. Not sensitive to changes in interest rates. Curbs over-indebtedness. Measures the debtor's "skin in the game", thus also reducing refinancing risk. Can be applied when EBITDA is not stabilised. An indebtedness ratio limit could differentiate between amortising and non-amortising loans. Firm-level debt/equity and debt/EBITDA limits are standard loan or bond covenants and therefore this information is normally already available for the financial institutions targeted by the CRE BBMs.	Debt-to-equity does not take into account debt repayment capacity. The numerator should consist of all debt incurred by the borrowing entity to avoid circumvention. Debt-to-equity fluctuates as the price of the property rises and falls, since changes in property value are reflected in equity levels.
Loan-to-value (LTV) at the level of a credit facility	Loan amount divided by the value of the real estate or cost of construction in case of construction loans at loan origination.	LTV at the level of a credit facility	Reduces the LGD of a loan and curbs over-indebtedness. Measures the debtor's "skin in the game", thus reducing refinancing risk. (Aggregated) data on CRE LTVs already available in supervisory data.	Appraisal assumptions make comparisons difficult, including across countries. Valuations are highly sensitive to assumptions about future developments. Assumptions of high future rental income, underestimation of CAPEX or falling yields inflate the "Value". Relatively slow-moving as re-appraisals are not frequently carried out.

Sources: Own work, Scope Ratings (2020)[64] and ESRB Handbook on Operationalising Macro-prudential Policy in the Banking Sector, and ESRB Recommendation 2019/3.

64 SCOPE (2020), *Investors should assess debt yield alongside traditional financial covenants to capture CRE risk.*, December.

Recommendation ESRB/2019/3 provides high-level guidance on the methods for calculating indicators relevant to the reporting of CRE data. While it does not prescribe detailed technical instructions, it does establish a conceptual framework for making such calculations. Similarly, the ECB guidelines on leveraged transactions use relatively straightforward definitions of indicators. Recommendation ESRB/2019/3 further states that, in the context of CRE financing, lenders are typically entitled to have their debt repaid solely from the income generated by the property, rather than from the borrower's other income or assets. This would justify calculating the DSCR at property level. Furthermore, the Recommendation suggests that focusing on a borrower's overall income could pose consolidation challenges, thus making it harder to construct a metric that is consistent and comparable across Member States. Nevertheless, the Recommendation acknowledges that, in certain instances, divergences from these principles may be warranted to accommodate for the specific characteristics of particular markets or market segments.

However, there are also strong arguments in favour of defining income- and indebtedness-based BBMs at the firm-level, based on the borrower's balance sheet data (firm-level approach), which includes all indebtedness of the CRE firm rather than focusing solely on the property level. Such an approach offers several advantages:

- It ensures that the borrower's overall financial standing is considered when assessing compliance with BBMs. By looking at all income sources and all indebtedness of the borrower, this approach provides a comprehensive picture of the risks associated with the repayment of all debts and obligations of the CRE firm, regardless of the lender and regardless of the CRE firm's corporate structure.

- It is in line with prevailing market practices, as reflected in financial covenants[65] commonly included in lending contracts by financial institutions, as well as with the methodologies employed by rating agencies, which rely on audited financial statements of CRE firms to calculate financial ratios. This alignment facilitates the comparability of BBMs across jurisdictions, thereby supporting the reciprocation of such measures.

- It is in line with national accounting and financial reporting regulations and commercial codes applicable across Member States.

- It reduces compliance and reporting costs for financial institutions by leveraging widely available balance sheet metrics derived from borrowers' financial statements, without the need to calculate the part of the borrower's income generated by a property.

[65] Such financial covenants are the result of negotiations between the lender and the borrower. When markets are expanding, borrowers may be able to negotiate looser covenants. At the international level, financial institutions frequently rely on standardised financial covenant definitions set out in internationally recognised standards, such as those developed by the Loan Market Association.

- It facilitates the calibration of BBMs by enabling the use of data from corporate financial statement registers and loan registers (e.g. AnaCredit).[66] For jurisdictions lacking such data (perhaps because there are no AnaCredit-like credit registers or data containing the financial accounts of CRE borrowers), national authorities could employ dedicated ad hoc reporting templates to collect granular information on credit standards applied by financial institutions for their CRE loan exposures.

Ideally, income-based and leverage-based BBMs should be calculated and applied at the level of consolidation that corresponds to the credit facility's financial covenants. This could be at the level of the borrowing firm or, where applicable, at the group level.[67] A consolidated approach offers several benefits:

- It captures the group's true financial standing, accounts for intragroup interconnectedness, and factors in the risk of financial difficulties spilling over from one entity to another.

- It mitigates the risk of borrowers engaging in practices such as fragmenting their CRE exposure across multiple borrowers (e.g. SPVs) to circumvent regulatory requirements.[68]

- It provides a more accurate measurement of the group's overall credit risk, particularly for groups heavily reliant on intercompany guarantees or intra-group loans.

- It simplifies compliance and enforcement.

Appendix II shows that a consolidated approach may be more effective in capturing the true size of credit risk.[69] However, this approach is not without challenges, as the consolidated borrower may not always be identifiable (e.g. in the case of partnerships), and income may not always accurately reflect value, particularly when income is deferred until project completion. In what follows of this paper, we describe the various proposed BBMs in more detail.

Proposed BBMs

Debt service coverage ratio (DSCR) and interest coverage ratio (ICR)

The DSCR and ICR measure the extent to which a CRE firm's income is sufficient to cover its debt service or interest expenses, respectively. The

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66 While this approach is easier to implement than others, it comes with certain limitations. For instance, in the case of non-listed firms there can be a significant time lag before their annual financial accounts become available. Moreover, corporate structures can be complex and there may be difficulties in separating different types of debt. The AnaCredit dataset is helpful in certain respects but focuses on bank loans, which is not sufficient on its own to identify and monitor aggregate risks or to calibrate appropriate policy measures for the wider sector.

67 Such an approach would be consistent with the ECB guidance on leveraged transactions.

68 Where a lender or investor uses a special purpose vehicle (SPV) as a dedicated CRE financing technique, such lending or investments should be considered as direct CRE lending or holdings ("look-through" approach).

69 The results indicate, for the illustrative example, that the DSCR might be lower at the consolidated level, while the debt-to-equity and debt-to-EBITDA ratios might be higher than at the unconsolidated level, for two SPVs forming a group with a holding company (HoldCo).

DSCR is defined as the ratio of net annual income[70] to annual debt service, while the ICR is defined as the ratio of net annual income to annual interest costs. In Recommendation ESRB 2019/3 on closing real estate data gaps, income is defined as the annual rental income generated from renting property to tenants or the annual cash flow generated by the business, purpose or activity of the owners of the property, net of any taxes and operational expenses needed to maintain the property's value and, in the case of cash flow, adjusted for other costs and benefits directly connected with the use of the property.[71]

Setting a floor for these metrics can provide a safety margin against income fluctuations (perhaps due to market downturns or inefficient management of tenants) and helps to ensure that borrowers can continue to meet their debt obligations in a timely manner. Experience from past CRE crises has shown that financial institutions which provided credit based on property values rather than positive cash flows sustained significant losses during downturns, especially when property values had been overestimated.[72] Therefore, establishing a minimum DSCR/ICR threshold reduces the probability of default.

To simplify computation, EBITDA (earnings before interest, tax, depreciation and amortisation) could be used as a proxy for net annual income. While EBITDA is easy to compute from a firm's financial statements, certain adjustments may be needed to account for payable taxes, CAPEX, and the timing of cash flows.[73] EBITDA is a well-established and reliable concept in both domestic and international financial reporting standards.

According to Recommendation ESRB/2019/3, total debt and debt service should include all loans taken and bonds issued, as reported in the financial statements of the CRE firm. This approach allows for the indirect coverage of CRE lending provided through bonds and lending from non-regulated entities. However, such a definition does not encompass committed but undrawn debt. A more practical definition, and one more closely aligned with the standards of the Loan Market Association, is provided in Appendix III. This definition includes, inter alia, all loans taken by the borrower, bonds issued, and obligations arising from financial lease transactions that have the commercial effect of borrowing.

The level of the DSCR is influenced by the loan's amortisation schedule. More precisely, lower annual amortisation leads to a higher calculated DSCR, which does not necessarily reflect greater resilience on the part of the borrower. For loans with no amortisation and long maturities, the DSCR is equal to the ICR, since only interest payments are included in the calculation. However, where the loan maturity is short and amortisation is low or absent (balloon or bullet loans),[74] and where maturing loans are repaid through new debt issuance, the DSCR may appear

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70 Defined over a rolling 12-month period or in line with national financial reporting standards.

71 In practice, this may be calculated by financing institutions by netting out revenue, operating expenditure, required capital expenditure, tax and working capital adjustments (see Mazars (2023), Cash Flow Available for Debt Service, 15 November.

72 See, for example, Vejledning om finansiering af udlejningsejendomme og ejendomsprojekter.

73 See, for example, Vejledning om finansiering af udlejningsejendomme og ejendomsprojekter.

74 This situation can arise when maturing loans are repaid by issuing new debt.

artificially low or misleading. This is because the ratio includes large principal payments that are not covered by operating cash flow. As a result, differences in amortisation schedules complicate the comparability of DSCR levels across lending transactions. Another factor that can result in an inflated DSCR without an actual improvement in borrower resilience is the deferral of necessary CAPEX.

Measures to address these challenges have been implemented in France and Denmark. In France, income-related BBMs for RRE are complemented by maturity limits to prevent lenders from circumventing restrictions by extending loan maturities.[75] Meanwhile, Danish guidelines require banks to assess whether a rental property achieves a positive cash flow under the assumption of annuity repayment at a fixed interest rate within 30 years (or shorter, if the life of the property is shorter) for loans granted within the lending limits of mortgage credit legislation, or within ten years if the loan is granted outside those limits.

Indebtedness

Indebtedness ratios indicate the extent to which a lender is prepared to bear the leverage risk of a CRE firm. By imposing limits on indebtedness, the incentive for default is reduced, thus lowering the probability of default. This is achieved by ensuring that the ultimate beneficiary of the borrowing entity maintains a sufficient financial stake in the venture, often referred to as having "skin in the game". A low equity position may signal that the customer lacks the financial means to contribute adequately to equity. Conversely, a higher level of equity mitigates refinancing risks and helps cushion the effects of rising interest rates or temporary income disruptions.

Indebtedness ratios may be expressed in terms of either the debt-to-equity ratio or the debt-to-EBITDA ratio. The debt-to-equity ratio reflects the owner's commitment to the CRE firm, while the debt-to-EBITDA ratio provides insights into the firm's capacity to meet its financial obligations. These ratios can be used for CRE firms engaged in both real estate development and rental or landlord activities, However, for firms primarily focused on development, where EBITDA may not be stable, the debt-to-equity ratio is likely to be more informative. Once EBITDA stabilises, both the debt-to-equity and the debt-to-EBITDA ratios can be applied effectively. Notably, indebtedness ratios are not influenced by changes in interest rates, amortisation periods or capitalisation rates (see OCC, 2022).

However, the debt-to-equity ratio does not account for the borrower's ability to repay the loan, as it abstracts from the income generated by the property. It is also sensitive to property revaluations, as any increase in the value of a CRE firm's property will automatically raise the equity value. At the same time, the debt-to-equity ratio complements the DSCR, as it excludes interest payments and is therefore less affected by the financial cycle or by changes in interest rate policy.

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[75] See Committee on the Global Financial System (2023), "Macroprudential policies to mitigate housing market risks, Country case study: France", *CGFS Papers*, No 69, December.

Loan-to-value

LTV limits are among the most widely used instruments to address imbalances in the CRE sector. This may be due to the relative complexity of designing alternative policy measures, or to data gaps. LTV limits serve to contain excessive credit growth, thereby reducing LGD. However, LTV ratios may exhibit procyclical tendencies, as inflated collateral values during boom periods can undermine the effectiveness of LTV limits in reducing LGD during downturns. For instance, in the most recent episode of excessive credit expansion, LTV ratios did not rise by much, whereas other metrics, such as the debt-to-EBITDA ratio, rose sharply. LTV limits have been implemented in various jurisdictions, including Cyprus, Denmark and Poland.[76] As with indebtedness ratios, LTV limits ensure that the ultimate beneficiary of the borrowing entity maintains sufficient "skin in the game".

LTV limits are applied on a loan-by-loan basis, specifically in relation to individual loans secured by immovable property. Where the entirety of a CRE firm's debt, as reflected on its balance sheet, is included in the calculation of the LTV ratio, and if the firm's assets consist solely of real estate, the LTV ratio effectively becomes the inverse of the debt-to-assets ratio, which happens to be another indebtedness metric. However, the LTV ratio cannot be calculated at the level of individual transactions for unsecured lending, in which case other BBMs should be considered.

To ensure consistency with supervisory reporting, the LTV ratio should be calculated in accordance with Recommendation ESRB/2019/3.[77] This recommendation stipulates that the property value should be determined at loan origination, measured as the lower of (i) the transaction value, such as that recorded in a notarial deed, and (ii) the value assessed by an independent external or internal appraiser at origination.[78] Furthermore, according to CRR3, the valuation should exclude speculative price expectations and should be adjusted to account for the risk of the current market price significantly exceeding the value deemed sustainable over the life of the loan.

Another measure worth considering is the introduction of amortisation requirements for CRE loans. Such requirements could address refinancing risk stemming from the prevalence of bullet loans in CRE lending (see ECB, 2022). As noted above, maturity limits may prevent lenders from bypassing DSCR restrictions by extending loan maturities. Furthermore, amortisation requirements could mitigate risks in situations where a property's cash flows are insufficient to cover the expenses or investments needed over the lifetime of the loan, or where debt service obligations cannot be met within the borrower's ownership period. These scenarios

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76 For a comprehensive record of macroprudential measures implemented across many jurisdictions see Alam Z., Alter A., Eiseman J., Kang H., Narita M., Nier E., Wang N. (2019), "Digging Deeper--Evidence on the Effects of Macroprudential Policies from a New Database", IMF Working Paper Series 66, March 22.

77 See 2024_7024 Calculation of the LTV ratio in FinRep | European Banking Authority.

78 In a similar vein, the US Office of the Comptroller of the Currency (OCC) requires that, for loans financing the purchase of an existing property, the value be taken as the lower of the actual purchase price or the property's estimated value.

create refinancing risks that amortisation requirements could help to control.[79] However, in some Member States, amortisation requirements may be out of line with prevailing market practices.

Box 5
Valuation practices among listed European CRE companies

Listed CRE companies regularly disclose information on the values of their property to investors and other stakeholders. Several techniques are used within the industry for this valuation:[80]

- **The market (or sales) approach**, where comparable market transactions are used to determine what a property could be sold for,[81] with the availability of comparable transactions depending on overall market activity. High interest rates dampen demand by increasing borrowing costs, while supply may be constrained by a reluctance among sellers to acknowledge that their property has lost value during a downturn.

- **The income approach**, where future expected cash flows are discounted to calculate the value of a property. This method relies on assumptions regarding the length of time the property will be held, the income it will generate (including rental growth and vacancies), maintenance costs, the terminal value and the discount rate. The discount/exit rate is inferred from previous transactions involving similar or comparable properties (i.e. market/sales approach). Assumptions regarding terminal value tend to have a greater effect than rental growth assumptions during the first few years of the forecast, meaning that property values should not change significantly due to a temporary drop in rents.

- **The cost approach**, where the value of a CRE property is equivalent to the cost of rebuilding the asset from scratch. This method is well-suited to highly specialised assets where there is no comparable transaction data and the assets do not earn income, or for assets that can be easily replicated.

- **Automated Valuation Models**, where the value of the property is calculated through the use of statistical models based on market data and the features of the property. These models are often employed to produce quick and relatively cheap property valuations. The EBA requires that, when using such statistical

[79] See e.g.Macroprudential policies to mitigate housing market risks Country case study: France December 2023, CGFS Papers December 2023.

[80] See Vulnerabilities in Non-bank Commercial Real Estate Investors - Financial Stability Board

[81] Article 229 of the CRR states that “the market value is the estimated amount for which the property would exchange on the date of valuation between a willing buyer and a willing seller in an arm’s-length transaction”.

models, institutions remain ultimately responsible for the appropriateness and performance of the models, and that the valuer remains responsible for the valuation. Institutions are expected to fully understand the methodology, input data and assumptions for the models used.[82]

- **Mortgage lending value**, which looks at the long-term sustainable features of the property and excludes speculative elements and fluctuations linked to the economic cycle

As long as the property is not being sold, appraisers assess its value using valuation models such as the discounted cash flow model or comparable transaction methods. In doing so, valuations are calculated in accordance with International Accounting Standards (IAS), and more precisely IAS 40, which provides guidance on the accounting of properties held to earn rent and/or for capital appreciation.

Valuations rely on comparable data that reflect current market conditions, which might be difficult to obtain in an illiquid market. While data from earlier transactions involving similar properties can be used, certain assumptions are made to account for differences between the sold property and the one currently being valued. However, these assumptions may not fully capture all relevant dynamics and property-specific features. For example, significant damage to a building, or long-term vacancy leading to squatters, will have a negative impact.

A model-based valuation, which relies on underlying assumptions, is unlikely to match the price at which the property would be sold.

Calibration of BBMs

Given the varying importance, heterogeneity and complexity of CRE markets across different countries, there is a strong rationale for entrusting national competent authorities (NCAs) with the exclusive responsibility for calibrating and activating measures for their own jurisdiction, provided that such measures are consistent with the objective of addressing financial stability risk.[83] This approach is also warranted due to differences in national accounting standards and practices. When designing CRE BBMs, NCAs should consider several key factors:

- **Heterogeneity of CRE projects and lending practices in their jurisdiction**: different types of real estate assets[84] exhibit varying capacities to generate stable and reliable income, face unique challenges in terms of property valuation, and may be financed through amortising or non-amortising loans. Properties associated with more volatile cash flows or financed via non-amortised loans may warrant stricter DSCR floors and tighter caps on LTV or indebtedness ratios. For example, in the United States, the Office of the

82 See EBA Guidelines on loan origination and monitoring.

83 See also ESRB Concept Note (2022), "Review of the EU Macroprudential Framework for the Banking Sector", 2022. Any ECB top-up powers currently apply to the banking sector of SSM countries through the SSM regulation.

84 For example, office buildings, warehouses, hotels/hospitality establishments, multi-flat rental properties, industrial property, retail property, undeveloped land, and mixed use property.

Comptroller of the Currency (OCC) has outlined five distinct LTV limits in its CRE inspection handbook, depending on the loan category.[85] Such differentiation can help prevent unintended effects, such as an increased preference for interest-only loans following the introduction of DSCR floors. Moreover, the structure of lenders varies by country; in many jurisdictions, banks account for the bulk of CRE lending, while in others, loans from NBFIs and market-based financing play a significant role. This illustrates the need for data on loans from non-banks to effectively calibrate and monitor BBM compliance.

- **Definition of BBM components**: precise definitions of BBM indicators are critical. For example, treating EBITDA as net rental income without deducting taxes and expenses required for property maintenance inflates the DSCR and ICR, thus overstating borrower resilience. Similarly, frequent property revaluations during market upturns can artificially reduce LTV ratios and inflate equity levels without altering the underlying risk profile, potentially necessitating stricter BBM recalibration during market booms. Furthermore, the scope of the debt definition used in BBM calculations (loans, bonds, other forms of borrowing) should be carefully reflected in BBM thresholds. If national authorities opt to calculate income- and indebtedness-related BBMs on a loan-by-loan basis rather than on a consolidated basis, different limits may also be warranted. In this context, initiatives to reduce existing data gaps are particularly important.

- **Avoidance of double counting of risks**: tailored LTV calibrations may be needed in order to prevent the double counting of risks owing to differences in valuation approaches, such as reliance on mortgage lending values versus market values. If market valuations are used without reference to the actual price paid for the property, more stringent thresholds might be needed.

- **Relationship between BBMs, existing capital-based measures and risks**: The relationship between CRE BBMs and credit risk should ideally be assessed by quantifying their impact on PD and LGD. This requires access to granular supervisory data on exposures, BBM levels and borrower PD/LGDs, supplemented, where relevant, by data retrieved from financial statement registries. Calibration efforts should also consider the extent to which risks associated with CRE financing remain unaddressed by existing capital-based measures.

- **Trade-offs in resilience through capital-based measures(for different types of financial institutions) and BBMs**: given their central, and complementary role in safeguarding financial stability, national authorities should carefully examine how BBMs and capital-based measures complement each other in bolstering financial stability, how they should be weighted, and what their possible limitations are.

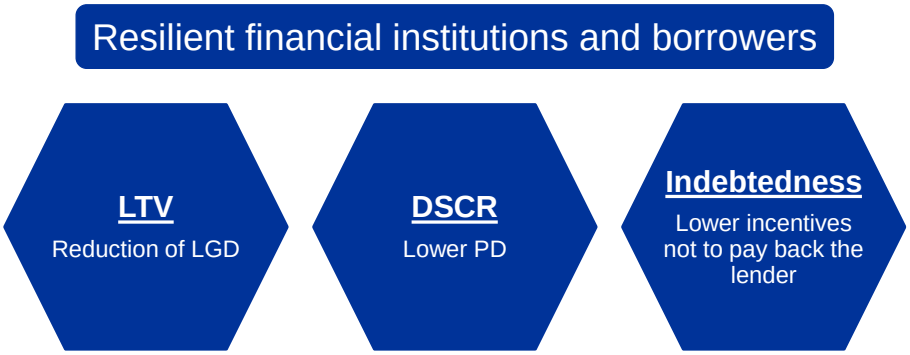
[85] For example, raw land (65%), land development (75%), construction (80-85%), and improved property (85-95)%.

- **Cost efficiency of compliance reporting**: BBMs should be designed to minimise compliance costs and administrative burden, leveraging on existing reporting requirements wherever possible. For instance, calibration could draw on data from existing annual financial statements and credit registries.
- **Gradual implementation to avoid cliff effects**: to ensure a smooth transition, authorities should consider a phased implementation of CRE BBMs, allowing sufficient time for borrowers and lenders alike to adapt to the new requirements.

Combined use of BBMs

Credit risk in CRE lending typically arises not from a single factor but from a combination of loan characteristics. Financial indicators are more informative when considered collectively rather than in isolation.[86] Therefore, both income-based and collateral-based measures should be implemented in tandem to prevent circumvention of restrictions. These measures complement each other, providing a more comprehensive assessment of the risk profile of the targeted borrowers (see **Figure 7**).

Figure 7
Resilience matrix



Source: ESRB.

The combined application of BBMs can help address the risks stemming from the practice of lending primarily against the collateral value of a property, without adequately considering the borrower's ability to repay the debt. Historical episodes of CRE crises reveal that financial institutions which based their lending decisions on the appraised value of financed CRE, rather than on the positive and sustainable cash flow generated by the CRE firm, incurred significant losses. Such losses were often driven by sharp declines in CRE market values during market downturns or an overestimation of property values at the time of loan origination. By contrast, losses were notably lower when CRE financing was supported by positive net rental income, both at the time the loan was granted and in future projections.

[86] For instance, a fully amortising loan with a 70% LTV and recourse to a stable parent company or a high DSCR may carry lower risk than a non-recourse bullet loan with a 60% LTV or a loan with a low DSCR.

5 What are the challenges and how can BBMs be implemented?

In this section we discuss potential leakages and the pros and cons of our proposed framework, while also looking at the proposed implementation flow.

Leakages

The proposed framework acknowledges that the introduction of BBMs might not fully eliminate leakages, meaning any situation where CRE firms obtain debt through mechanisms that fall outside the scope of BBMs in a given Member State. Channels for potential leakage include:

- **Cross-border lending outside the EEA**: leakages may occur when a firm owning real estate located in the EEA, be it foreign or domestic, borrows exclusively from financial institutions domiciled outside the EEA, which are not subject to the EEA reciprocity framework. A similar risk emerges if a CRE firm, after borrowing from an EEA bank, issues bonds purchased by non-EEA investors, leading to a level of indebtedness that exceeds the thresholds set by BBMs. To mitigate this, financial covenants tied to prevailing BBM thresholds may render loans callable if additional borrowing breaches such covenants.
- **Non-supervised domestic financial institutions**: in some cases, CRE firms may secure financing from non-supervised domestic entities, such as private equity firms or other investment vehicles funded by high-net-worth individuals. While the systemic risk associated with such lending may be limited – given that these lenders may suspend or postpone payments to their shareholders in the event of repayment difficulties – this still carries the risk of creating an uneven playing field between supervised and unsupervised lenders and of moving risks outside the regulated financial system.
- **SPVs**: financing arranged through SPVs domiciled outside the regulated area, coupled with "back leverage"[87] from domestic financial institutions, could allow firms to circumvent BBM thresholds.
- **Lack of indebtedness/income BBMs**: if only loan-level LTV limits are applied, without complementary indebtedness- or income-based measures, CRE firms may end up borrowing from multiple lenders without disclosing their total indebtedness. However, this risk could be contained through market practices

[87] "Back leverage refers to the practice of debt funds borrowing from third party lenders to partially finance loans the debt fund makes to underlying borrowers." See Phillips, R. and White, D. (2025), "An introduction to back leverage in real estate debt funds", LaSalle Investment Management, 21 October.

that include negative pledge clauses[88] or limits on additional borrowing included in loan agreements and bond indentures.

- **Regulatory arbitrage across Member States**: if BBMs are introduced in only one country or if they are calibrated differently across countries, CRE firms may seek financing in countries with less stringent BBM calibration.

Such leakages could make domestic monitoring less transparent and increase reliance on cross-border financing of CRE, which introduces rollover risk as foreign investors may withdraw more rapidly in times of market stress.

While leakages cannot be entirely eliminated, their likelihood and potential consequences can be reduced by several factors, including:

- **Indirect coverage of all debt**: EEA-based CRE firms typically rely on loans from supervised EEA financial institutions. However, our proposed framework, by adopting a broad definition of debt, would indirectly cover any debt incurred by the CRE firm, including from non-EEA lenders and non-supervised entities and also through bond issuance. Furthermore, national financial regulators may impose BBM limits on bond issuance, where legally feasible.
- **Rollover of loans**: CRE firms that exceed BBM thresholds would face significant challenges. Their inability to comply with BBMs could make it harder for them to borrow from EEA financial institutions, frustrate the rollover of existing loans, and shut the door to working capital loans. Furthermore, loans and bonds could be called by a financial institution, leaving the CRE firm without adequate financing.
- **SPV identification:** if an SPV can be identified as a CRE entity, lending to that SPV by domestic financial institutions would still fall within the scope of BBMs.
- **Complementary measures:** leakage arising from the exclusive use of LTV limits can be mitigated by combining these with income- and indebtedness-related limits.
- **EEA-wide reciprocity**: within the EEA, regulatory arbitrage due to differences in BBM calibration and activation could be addressed through reciprocity arrangements.
- **Common definitions:** authorities should ensure consistency by adopting, to the extent possible, existing working definitions to delineate the scope of BBM application (in terms of targeted exposures and entities) and to determine the relevant metrics for setting BBMs.

[88] A negative pledge clause in a loan agreement or a bond indenture restricts the right of the borrower to grant security (such as a lien, mortgage, charge, or pledge) over its assets to other lenders, unless the current lender is afforded the same protection or accepts the posting of this new security.

Pros and cons

The primary advantage of BBMs is their ability to address systemic risk associated with excessive credit growth in CRE markets and unsound lending practices. This is achieved through both the direct and indirect coverage of CRE lending. Furthermore, BBMs are able to leverage existing metrics and are broadly aligned with common lending practices, thus limiting the need for additional data collection and lowering the administrative costs involved. Leakages are further contained through the direct coverage of lending by supervised entities, and the indirect coverage of any remaining lending where the CRE entity borrows (or needs to borrow in the future) also from a supervised entity. Lastly, applying BBMs at firm level is particularly effective when it comes to the financing of new CRE developments, where future income streams are highly uncertain. Unlike RRE lending, where household income streams are typically stable, CRE income streams are influenced by cyclical factors such as rent levels and vacancies.[89] Taking group-level income into account provides a more robust framework for managing these fluctuations.

The main costs arising from the implementation of CRE BBMs relate to the administrative burden on supervisors and the risk of unintended side effects. National competent authorities must define relevant CRE firms, establish key BBM metrics and calibrate appropriate limits, speed limits[90] and materiality thresholds so as to achieve the macroprudential objective of limiting CRE-related systemic risk while minimising the potential side effects of the measures. This would involve setting up processes for monitoring and enforcement. For an overview of the national competent authorities responsible for different entities and for adopting BBMs across EEA countries, please see Appendix IV. Another important issue could be the lack of harmonisation of metrics at the EU level that could impair the reciprocation of measures across countries, which is particularly important given the cross-border nature of much CRE lending.

Implementation flow

Before activating CRE BBMs, national authorities should assess whether developments in CRE markets pose financial stability risks that are not adequately addressed by existing measures. As a first step, relevant authorities should monitor systemic risk arising from their own CRE market, as suggested in Recommendation ESRB/2022/9 A. In doing so, they should flag specific market segments requiring closer attention, while also looking at the relative significance of

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89 See, for example, the ESRB Report on vulnerabilities in the EU commercial real estate sector ESRB 2018 and the ESRB Handbook.

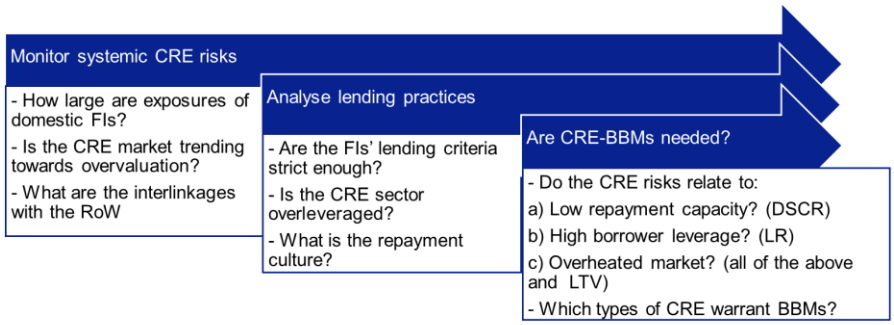
90 Flexibility margins (or speed limits) are calibration instruments designed to mitigate the potential costs associated with BBMs. They allow lenders to exempt a predefined share of new lending from the application of BBMs, thereby introducing a degree of flexibility into the implementation of the policy. These margins serve multiple objectives. They can help mitigate potential adverse economic effects arising from regional disparities in CRE market conditions within a country. Additionally, they offer a recalibration mechanism that does not require altering the core parameters of the BBMs themselves—an approach that has been operationalised, for instance, in New Zealand. Flexibility margins are often tailored to specific borrower segments, thereby supporting complementary policy goals. In France, for example, they have been used to preserve access to housing finance for first-time buyers. In the context of CRE, such margins could for instance incentivise lending towards environmentally sustainable buildings, which are expected to present lower credit risk in light of future regulatory developments.

complex financing structures, and the extent of cross-border lending. Authorities should also determine which CRE firms are relevant for the potential application of CRE BBMs.

Furthermore, national authorities should evaluate the sources of CRE financing within their jurisdiction to identify the types of lending that BBMs could target and to assess the potential for regulatory arbitrage or leakage (see left-hand panel of **Figure 8**). Such monitoring is also recommended in the ESRB's report on methodologies for the assessment of CRE vulnerabilities. As noted in Section 2 of this paper, while bank loans remain the primary source of CRE financing, they are supplemented by non-bank lending and bond issuance, which are not explicitly covered under the compliance criteria of the aforementioned recommendation. This diversity in CRE financing structures is a key factor contributing to the complexity of implementing CRE BBMs and varies significantly across countries. It is therefore essential that policymakers fully understand the scope of this challenge within their respective jurisdictions.

Figure 8

Workflow for domestic macroprudential authorities



Source: ESRB.

If systemic risks associated with the CRE sector are identified, national authorities should conduct an in-depth analysis of lending practices related to CRE financing (see middle panel of **Figure 8**). This analysis should include an evaluation of lending standards applied to CRE financing, an assessment of whether the CRE sector is overleveraged, and a review of the repayment culture for CRE lending. These steps are consistent with Recommendation ESRB/2022/9 B, which calls on supervisory authorities to ensure sound CRE financing practices when financial stability risks stemming from CRE markets are deemed significant.

CRE BBMs would then allow policymakers to directly target the sources of CRE systemic risk (see right-hand panel of **Figure 8**). For instance, where the identified risks primarily stem from low repayment capacity, limits on the DSCR or ICR may be appropriate. Conversely, if borrowers are highly leveraged, indebtedness ratios could be applied. In situations where the CRE market is assessed by the relevant NCA to be overheated, or where high indebtedness

coincides with low repayment capacity, a combination of all three BBMs may be warranted. Ideally, such measures should be activated by NCAs with appropriate phasing-in arrangements.

The effective assessment of exposures and risks stemming from the CRE sector, the calibration of CRE BBMs, and the monitoring of compliance require high-quality data, including data retrieved from the financial statements of CRE firms. However, such data may not always be readily available to NCAs. Moreover, this process would benefit from the adoption of an EU-wide common set of definitions for lending standard indicators, as proposed in Recommendation ESRB/2016/14 on closing real estate data gaps, as amended by Recommendation ESRB/2019/3. This should also include exposures to CRE-related bonds. Enhancing data reporting requirements is essential and should include improvements in data sharing across institutions to ensure a better understanding of international linkages in CRE lending. While Recommendation ESRB/2016/14 provides a detailed set of lending standards for CRE loans, such as LTV and the DSCR, additional data is required to close existing gaps. This includes information on indebtedness ratios, amortisation structures, and exposures related to CRE bonds, where such data is not already available through existing registers.

6 Concluding remarks

This paper has discussed how BBMs applied to CRE lending could be effective in reducing credit risk by curbing excessive credit growth and preventing the unwarranted relaxation of lending standards. However, implementing BBMs in CRE lending is more complex than in the case of RRE lending due to the diverse and intricate financing structures commonly used in CRE markets and to remaining data gaps. The paper explains the rationale for BBMs applied to CRE lending, analyses the financing structures present within CRE markets, and makes a proposal as to how CRE lending could be effectively covered by BBMs.

The proposed BBMs target debt service coverage ratios (DSCR), interest coverage ratios (ICR) and indebtedness ratios at the firm-level, along with loan-to-value (LTV) ratios at the credit facility level to mitigate systemic risk. Moreover, NCAs should be largely responsible for activating and calibrating BBMs within their jurisdiction, due to the heterogeneity of national CRE markets. A key advantage of the firm-level approach is that regulatory leakages are limited through the direct coverage of lending among supervised entities, combined with the indirect coverage of any remaining lending where the CRE entity borrows (or needs to borrow in the future) also from a supervised entity. Moreover, this approach is aligned with existing market practices and minimises implementation complexity.

This paper is also aligned with the ESRB Recommendation to the European Commission ESRB/2022/9 D, which calls for activity-based macroprudential tools to address CRE vulnerabilities and to prevent regulatory arbitrage.

Appendix I

Table A.1

Macroprudential policies and downside risks to CRE prices

CRE-specific macroprudential policies by country	Date	Description
Cyprus	Nov. 2003	As per the latest amendment (March 2021), the following LTV limits apply: - 80% for primary residence - 50% LTV limit if the credit facility is granted to a real estate development company to finance the acquisition or the construction of luxurious properties and 70% for all other property financing
Denmark	Jun. 2003	60% LTV limit on recreational dwellings, office properties and retailing properties, industrial properties and craftsman's properties, collective energy-supply plants
Hong Kong SAR	Feb. 2013	10 pp lower LTV limit on mortgage loans for all commercial and industrial properties
Hong Kong SAR	May 2017	Lowering the applicable DSR limit by 10 percentage points for mortgage to borrowers whose income is mainly derived from outside of Hong Kong SAR
Indonesia	Jun. 2012	LTV limit of 70% on 2nd loan for an office/shop house; 60% for 3rd or more loans for an office/shop house
Indonesia	Jun. 2015	Lifting LTV ratio for property (including office houses) loans
Indonesia	Aug. 2016	Lifting LTV limit on office houses based on banks' internal policy (first loan), 85% (second loan), 80% (third loan or more)
Indonesia	Jun. 2018	Lifting regulatory limits on the first mortgage on home stores/home offices
Ireland	Jan. 2007	Minimum risk weight on commercial property lending increased from 50% to 100%
Ireland	Jan. 2014	Minimum risk weight applied to commercial property lending was increased to 100% from 50%
Norway	Sep. 2014	Risk weight of 100% on CRE lending for banks using the standardised approach
Poland	Jan. 2005	100% risk weight on non-residential property
Poland	Jun. 2014	75% or 80% LTV limit on CRE loans if the part above 75% is insured or collateralised with funds on bank account, government or NBP securities
Poland	Dec. 2017	For banks using the Standardised Approach to determine capital requirement: 100% risk weight on exposures secured by commercial immovable property located in Poland
Singapore	Jan. 2013	Seller's stamp duties for industrial properties
Singapore	Jun. 2013	Total Debt Servicing Ratio (TDSR) to the loan applied for both residential and non-residential property (e.g., industrial, and commercial property), and covers property both in- and outside of Singapore
Spain	May. 2008	Stringent capital requirements on commercial real estate and residential real estate exposures

CRE-specific macroprudential policies by country	Date	Description
Sweden	Jan. 2014	Risk-weight floor framework for commercial mortgages at 100% for exposures calculated according to the standardised approach for credit risk, further included in Pillar 1 requirements as of 2023. Risk weight floor for banks' aggregated CRE exposures since 2020 (25% for commercial residential property and 35% for other commercial property (office, retail, warehouse, industrial, etc.). This was moved to Pillar 1 according to Art. 458 of the CRR in 2023. The CRE RW-floor is applicable to all credit institutions authorised in Sweden using the Internal Ratings Based (IRB) approach for calculating regulatory capital requirements.
United Kingdom	Jan. 2014	Stricter criterion requirement for firms to determine whether the annual average loss rates for lending secured by mortgage on commercial real estate in the UK did not exceed 0.5% over a representative period
United Kingdom	Oct. 2014	Stricter criteria for the eligibility of the 50% risk weight (RW) exposures fully and completely secured by mortgages on commercial real estate located in a non-EEA country entered into force
United States	Dec.2006	Guidance to banks with high CRE risk concentrations to tighten managerial controls
United States	Jan. 2015	150% risk weight on HVCRE exposure held by a banking organisation
United States	Dec.2016	Implementation of risk retention rule. The risk retention rules require that at least one sponsor of a securitisation (or its majority owned affiliate) retain a 5 percent interest in the credit risk of the securitised assets.

Source: Deghi, A., Mok, J. and Tsuruga, T. (2021), "Commercial Real Estate and Macrofinancial Stability During COVID-19", *IMF Working Paper*, No 2021/264.

Appendix II

Example of BBM calculations for a group of connected companies based on balance sheet data

The example assumes a group structure comprising one holding company (HoldCo) holding shares in two SPVs (SPV 1 and SPV 2) engaged in CRE projects: CRE 1 (valued at €120 million) and CRE 2 (valued at €300 million). These CRE properties are amortised over a 25-year term. Other key assumptions are as follows:

- SPV 1 and SPV 2 hold cash balances of €80 million and €40 million, respectively, in their bank accounts.
- Both SPVs are financed by equity (€25 million and €40 million, respectively), an intercompany loan (€30 million and €90 million, respectively) originated by HoldCo, bonds held by other investors (€20 million and €100 million, respectively), and a bank loan (€125 million and €110 million, respectively).
- HoldCo is financed by equity (€10 million), bonds held by other investors (€35 million), a bank loan (€105 million) and other liabilities not bearing interest (€50 million). HoldCo also owns assets related to other activities, including cash (€15 million).
- All bank loans and bonds mature in ten years, and are repaid in equal principal instalments, while the interest rate is 5% p.a. on the intercompany loan and the bonds and 6% p.a. on the bank loans.
- In a given year, SPV1 and SPV2 earned rental income of €130 million and €200 million, respectively, while the operating costs incurred by these SPVs are €32 million and €70 million, respectively.
- HoldCo's revenues consist of the dividends paid by the SPVs (€25 million and €45 million), along with interest on the intercompany loans (€2 million and €5 million, respectively) that HoldCo granted to the SPVs. HoldCo's operating costs amount to €38 million.
- The applicable tax rate for both the SPVs and HoldCo is 20%. The consolidated accounts reconcile tax shields on intragroup transactions.

The financial statements and BBMs for both the unconsolidated and the consolidated accounts are presented below. The results show that the DSCR is lower at the consolidated level, while the debt-to-equity and debt-to-EBITDA ratios are higher than at the solo level for both SPV1 and SPV2. This confirms the need to assess the credit risk of the group of borrowers on a consolidated basis.

	SPV1	SPV2	HoldCo	
	unconsolidated			consolidated
LTV	146%	100%	-	118%
DSCR	4.2	3.8	1.7	2.4
Debt to Equity	7.0	7.5	14.0	49.5
Debt to EBITDA	1.7	2.1	3.7	2.6

BBMs calculated in the unconsolidated presentation

Balance sheet SPV1			
		Equity in SPV1	€ 25
CRE 1	€ 120	Intercompany loan to SPV1	€ 30
		Bond issued by SPV1	€ 20
		Bank loan taken by SPV1	€ 125
Cash	€ 80		
	€ 200		€ 200

LtV	146%
DSCR	3.07
ICR	7.52
DebtYield	0.53
Leverage: Debt to Equity	7
Leverage: Debt to EBITDA	1.70

P&L SPV1	
Rental income SPV1	€ 130
OpCost SPV1	-€ 32
Amortization/Depreciation	-€ 5
EBITDA	**€ 103**
Interest	
IntCompLoan SPV1	-€ 2
Interest on Bond issued by	-€ 1
Interest on Loan taken by S	-€ 8
Gross profit	**€ 88**
Tax of SPV1	-€ 18
Net profit SPV1	**€ 70**

Maturity of the loan/bond SPV 10 yrs

Cash Flow SPV 1	
Operating Cash Flow	
Net profit SPV1	€ 70
(+)Depreciation & Amortizat	€ 5
Cash from Operations	€ 75
Financing Cash Flow	
Change in bonds/loans (repa	-€ 15
Dividends paid to HoldCo	-€ 25
Cash from Financing	-€ 40
Net Increase (decrease) in	**€ 36**
Opening Cash Balance	€ 44
Closing Cash Balance	€ 80

Balance sheet SPV2			
		Equity in SPV2	€ 40
CRE 2	€ 300	Intercompany loan to SPV2	€ 90
		Bond issued by SPV2	€ 100
		Bank loan taken by SPV2	€ 110
Cash	€ 40		
	€ 340		€ 340

LtV	100%
DSCR	2.78
ICR	6.40
DebtYield	0.39
Leverage: Debt to Equity	7.5
Leverage: Debt to EBITDA	2.11

P&L SPV2	
Rental income SPV2	€ 200
OpCost SPV2	-€ 70
Amortization/Depreciation	-€ 12
EBITDA	**€ 142**
Interest	
IntCompLoan SPV2	-€ 5
Interest on Bond issued b	-€ 5
Interest on Loan taken by	-€ 7
Gross profit	**€ 114**
Tax of SPV1	-€ 23
Net profit SPV1	**€ 91**

Cash Flow SPV 2	
Operating Cash Flow	
Net profit SPV2	€ 91
(+)Depreciation & Amortiza	€ 12
Cash from Operations	€ 103
Financing Cash Flow	
Change in bonds/loans (re	-€ 21
Dividends paid to HoldCo	-€ 45
Cash from Financing	-€ 66
Net Increase (decrease) in	**€ 37**
Opening Cash Balance	€ 3
Closing Cash Balance	€ 40

Balance sheet HoldCo			
Equity in SPV1	€ 25	Equity of HoldCo	€ 10
Equity in SPV2	€ 40	Bond issued by HoldCo	€ 35
Intercompany loan to SPV1	€ 30	Loan taken by HoldCo	€ 105
Intercompany loan to SPV2	€ 90		
Oth Assets rlt to oth activity inc.cash	€ 15	Other Liabilities	€ 50
	€ 200		€ 200

DSCR	1.09
ICR	2.98
Leverage: Debt to Equity	14
Leverage: Debt to EBITDA	3.68

P&L HoldCo	
Dividends from SPV1	€ 25
Dividends from SPV2	€ 45
Interest on IntCompLoan SPV 1	€ 2
Interest on IntCompLoan SPV2	€ 5
OpCost HoldCo	-€ 38
EBITDA	**€ 38**
Interest on bonds issued	-€ 2
Interest on loans taken	-€ 6
Gross profit	**€ 30**
Tax of HoldCo	-€ 6
Net profit Holdco	**€ 24**

Maturity of the loan/bond HoldCo 10 yrs

Cash Flow HoldCo	
Operating Cash Flow	
Net profit	€ 24
(+)Depreciation & Amortization	€ 0
Cash from Operations	€ 24
Financing Cash Flow	
Change in bonds/loans (repayment	-€ 14
Cash from Financing	-€ 14
Net Increase (decrease) in Cash	**€ 10**
Opening Cash Balance	€ 5.0
Closing Cash Balance	€ 15

BBMs calculated for the consolidated presentation

Balance sheet HoldCo

		Equity of HoldCo	€ 10
CRE 1	€ 120	Bond issued by HoldCo	€ 35
		Loan taken by HoldCo	€ 105
		Bond issued by SPV1	€ 20
		Bond issued by SPV2	€ 100
CRE 2	€ 300	Bank loan taken by SPV1	€ 125
		Bank loan taken by SPV2	€ 110
Cash from SPV 1	€ 80		
Cash from SPV 2	€ 40		
Other Assets rlt to other activity	€ 15	Other Liabilities	€ 50
	€ 555		€ 555

HoldCo	
LtV	118%
DSCR	1.71
ICR	4.72
Debt Yield	0.35
Leverage: Debt to Equity	49.5
Leverage: Debt to EBITDA	2.61

P&L HoldCo

Rental income SPV1	€ 130.0
Rental income SPV2	€ 200.0
OpCost SPV1	-€ 32.0
OpCost SPV2	-€ 70.0
OpCost HoldCo	-€ 38.0
EBITDA	**€ 190.0**
Amortization/Depr SPV1	-€ 4.8
Amortization/Depr SPV2	-€ 12.0
Interest	
on bonds issued Hold Co	-€ 1.8
on bond issued by SPV1	-€ 1.0
on bond issued by SPV2	-€ 5.0
on loans taken HoldCo	-€ 6.3
on loan taken by SPV1	-€ 7.5
on loan taken by SPV2	-€ 6.6
Gross profit	**€ 145**
Taxes after reconciliation	-€ 29
Net profit Holdco	**€ 116**

Maturity of the loan/bond SPV	10
Maturity of the loan/bond HoldCo	10

Operating Cash Flow	
Net profit	€ 116
(+) Depreciation & Amortiza	€ 17
Cash from Operations	€ 133

Financing Cash Flow	
Change in bonds/loans	
HoldCo	-€ 14
SPV 1	-€ 15
SPV 2	-€ 21
Cash from Financing	-€ 50

Net Increase (decrease) ir	**€ 83**
Opening Cash Balance	
HoldCo	5.04
SPV 1	44.30
SPV2	2.88
Closing Cash Balance	**€ 136**

Tax reconciliation: intra-group transactions

Tax paid by:

SPV 1	-€ 17.6	
SPV 2	-€ 22.8	
HoldCo	-€ 6.0	
		-€ 46.4

Tax paid by HoldCo on dividends from

SPV 1	€ 5	
SPV 2	€ 9	
		€ 14

Tax not paid by SPVs on amortization

SPV 1	€ 1.0	
SPV 2	€ 2.4	
		€ 3.4
Tax after reconciliation		-€ 29.0

Appendix III

Possible definition of financial indebtedness, in line with Loan Market Association definition

"Financial Indebtedness" means any indebtedness for or in respect of:

(a) moneys borrowed and debit balances at banks or other financial institutions;

(b) any amount raised by acceptance under any acceptance credit or bill discounting facility or dematerialised equivalent;

(c) any amount raised pursuant to any note purchase facility or the issue of bonds, notes, debentures, loan stock or any similar instrument;

(d) the amount of any liability in respect of any lease or hire purchase contract which would, in accordance with accounting principles prevailing in the Member State, be treated as a balance sheet liability (finance or capital lease);

(e) receivables sold or discounted (other than any receivables to the extent they are sold on a non-recourse basis);

(f) any amount raised under any other transaction (including any forward sale or purchase agreement, sale and sale back or sale and leaseback agreement) having the commercial effect of a borrowing; *(however, for the avoidance of doubt, this does not include any deferred payment arrangements with trade creditors as customary in the industry or endorsement of negotiable instruments for deposit or collection);*

(g) any derivative transaction entered into in connection with protection against or benefit from fluctuation in any rate or price (and, when calculating the value of any derivative transaction, only the marked to market value (or, if any actual amount is due as a result of the termination or close-out of that derivative transaction, that amount) shall be taken into account);

(h) any counter-indemnity obligation in respect of a guarantee, indemnity, bond, standby or documentary letter of credit or any other instrument issued by a bank or financial institution;

(i) any amount of any liability under an advance or deferred purchase agreement if:

  (i) one of the primary reasons behind entering into the agreement is to raise finance or to finance the acquisition or construction of the asset or service in question; or

(ii) the agreement is in respect of the supply of assets or services and payment is due more than a specified number of days after the date of supply;

(j) any amount raised by the issue of shares which are redeemable (other than at the option of the issuer) before the maturity date of the loan or are otherwise classified as borrowings under the accounting principles prevailing in the Member State;

(k) (without double counting) the amount of any liability in respect of any guarantee or indemnity for any of the items referred to in paragraphs (a) to (j) above.

Appendix IV

Table A.2

Overview of macroprudential and supervisory authorities in EEA countries and corresponding legal frameworks for BBMs on RRE and CRE

Country	Macroprudential authorities	Supervisory authority for credit institutions	Supervisory authority for pension funds and insurance companies	Supervisory authority for investment funds and asset managers	Supervisory authority for markets	Legal framework for BBMs on RRE and, if applicable, authority responsible for their adoption	Legal framework for BBMs on CRE and, if applicable, authority responsible for their adoption
Austria	Financial Market Stability Board (FMSB/ FMSG) (macroprudential authority) + Financial Market Authority (designated authority in accordance with Article 136 CRD IV)	ECB (SIs) + FMA and OeNB (LSIs)	FMA	FMA	FMA	Yes – Not Binding (LTV, DSTI and maturity limits supervisory expectations, reviewed within ongoing supervision – adopted by FMA)	No
Belgium	Nationale Banque van België/Banque Nationale de Belgique (NBB/BNB)	ECB (SIs) + NBB (LSIs); FSMA oversees conduct for both SIs and LSIs	Pensions funds: FSMA Insurance companies: NBB (prudential) + FSMA handles conduct/consumer protection	FSMA supervises UCITS/AIF management companies, and (under MiFID) portfolio management & investment advice companies [prudential supervision of these firms lies with FSMA; stockbroking firms are prudentially supervised by NBB]	FSMA	Yes – Not binding, on a "comply or explain" basis, in the form of "expectations" (LTV & DSTI or DTI limit). The macroprudential framework also foresees the possibility of legally-binding BBMs, although this is the prerogative of the Belgian Parliament	Yes – The macroprudential framework also foresees the possibility of legally-binding BBMs, although this is the prerogative of the Belgian Parliament
Bulgaria	Българска народна банка (Bulgarian National Bank) (BNB) (designated authority) Financial Supervision Commission (FSC)	ECB (SIs) + BNB (LSIs)	FSC	FSC	FSC	Yes – Binding: LTV, DSTI , maximum maturity limits – adopted by BNB	No

Country	Macroprudential authorities	Supervisory authority for credit institutions	Supervisory authority for pension funds and insurance companies	Supervisory authority for investment funds and asset managers	Supervisory authority for markets	Legal framework for BBMs on RRE and, if applicable, authority responsible for their adoption	Legal framework for BBMs on CRE and, if applicable, authority responsible for their adoption
	(macroprudential authority)						
Croatia	Hrvatska narodna banka (Croatian National Bank) (HNB) in consultation with the Financial Stability Council (includes the HNB, Ministry of Finance and Croatian Financial Services Supervisory Agency HANFA)	ECB (SIs) + HNB (LSIs)	HANFA	HANFA	HANFA	Yes – Binding: LTV and DSTI, adopted by the HNB.	No
Cyprus	Central Bank of Cyprus (CBC)	ECB (SIs) + CBC (LSIs)	Pension funds: RORBF Insurance companies: ICCS	CySEC	CySEC	Yes – Binding: LTV ratios, DSTI ratios – adopted by CBC	Yes – Binding: LTV ratios, adopted by CBC
Czech Republic	Česká národní banka (Czech National Bank) (CNB)	CNB	CNB	CNB	CNB	Yes – Binding and non-binding adopted by the CNB	No
Denmark	Systemic Risk Council (representatives of Danmarks Nationalbank, DFSA, ministries and independent experts) and the Minister for Industry, Business and Financial Affairs as the designated authority	Finanstilsynet (Danish Financial Supervisory Authority) (DFSA)	DFSA	DFSA	DFSA	Yes – non binding, LTV and DTI limits adopted by the Systemic Risk Council	No
Estonia	Eesti Pank (Bank of Estonia)	ECB (SIs) + Finantsinspektsioon (Estonian Financial Supervisory	Finantsinspektsioon	Finantsinspektsioon	Finantsinspektsioon	Yes – binding: LTV, DSTI and maturity limits. Adopted by Eesti Pank	No

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		Authority) (LSIs)					
Finland	Board of Finanssivalvonta (Finnish Financial Supervisory Authority) (FIN-FSA) (in coordination with Suomen Pankki (Bank of Finland)	ECB (SIs) + FIN-FSA (LSIs)	FIN-FSA	FIN-FSA	FIN-FSA	Yes – Binding: LTV and maturity limits adopted by the Board of FIN-FSA. Non-binding: DSTI is subject to a Recommendation, adopted by the Board of FIN-FSA	No
France	Haut Conseil de Stabilité Financière (HCSF)	ECB (SIs) + Autorité de contrôle prudentiel et de résolution (ACPR) (LSIs)	ACPR	Autorité des marchés financiers (AMF)	AMF	Yes – binding (i) DSTI (ii) maximum maturity – adopted by HCSF	Legal basis exists but no HCSF binding borrower-based decision specifically targeting CRE loans is in force – would be adopted by HSCF
Germany	Financial Stability Committee (Ausschuss für Finanzstabilität – AFS)	ECB (SIs) + BaFin in cooperation with Deutsche Bundesbank (LSIs)	Bundesanstalt für Finanzdienstleistungsaufsicht (BaFIN)	BaFin	BaFin + Exchange Supervisory Authority + Trading Surveillance Office	Yes (binding framework exists). Legal powers for borrower-based instruments (e.g. LTV caps, amortisation requirements) for new RRE loans are in § 48u KWG plus the Regulation on the implementation of measures in residential real estate lending; also cross-references in KAGB § 5(8a) and VAG § 308b. Status: Germany has not activated these borrower-based measures to date. – would be adopted by BaFin	No
Greece	Bank of Greece (BoG)	ECB (SIs) + BoG (LSIs)	BoG	Hellenic Capital Market Commission (HCMC)	HCMC	Yes – Binding: DSTI-O and LTV-O – adopted by BoG	Framework exists only for loans collateralised by immovable property but no CRE-specific binding BBMs have been enacted as of yet – BoG
Hungary	Magyar Nemzeti Bank (MNB)	MNB	MNB	MNB	MNB	Yes – Binding: LTV and DSTI adopted by the MNB	No
Ireland	Central Bank of Ireland (CBI)	ECB (SIs) + CBI (LSIs)	CBI	CBI	CBI	Yes – Binding: Loan-to-income (LTI) caps; Loan-to-value (LTV) floors, adopted by CBI	No

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Italy	Banca d'Italia (designated macroprudential authority) + Committee for Macroprudential Policies (macroprudential authority)	ECB (SIs) + Banca d'Italia (LSIs)	Pension funds: COVIP Insurance cos: IVASS	Banca d'Italia (prudential, financial stability risks) and CONSOB (conduct/transparency).	Banca d'Italia (financial stability risks) and CONSOB (conduct/transparency) for government bonds + CONSOB for other markets	Yes (binding framework exists)	Yes (binding framework exists)
Latvia	Latvijas Banka (Bank of Latvia)	ECB (SIs) + Latvijas Banka (LSIs)	Latvijas Banka	Latvijas Banka	Latvijas Banka	Yes – Binding: LTV for buy-to-let loans, DSTI, DTI and maturity limits set by Latvijas Banka for credit institutions; general LTV limits for all consumer lenders set in Consumer Rights Protection Law. Non-binding: DSTI guidelines for all consumer lenders as a recommendation set by the Consumer Rights Protection Centre.	No
Lithuania	Lietuvos bankas (Bank of Lithuania)	ECB (SIs) + Lietuvos bankas (LSIs)	Lietuvos bankas	Lietuvos bankas	Lietuvos bankas	Yes – Binding: LTV, DSTI and maximum loan maturity, adopted by Lietuvos bankas	No
Luxembourg	Comité du Risque Systémique (CdRS / Systemic Risk Committee), Commission de Surveillance du Secteur Financier (CSSF)	ECB (SIs) + CSSF (LSIs)	Pension funds: Two regimes: (i) IORPs in the form of SEPCAV/ ASEP are supervised by the CSSF; (ii) certain pension funds linked to insurance are supervised by the CAA. Insurance Cos: CAA	CSSF	CSSF	Yes – Binding: LTV, adopted by CSSF	No
Malta	Central Bank of	ECB (SIs) + Malta Financial	MFSA	MFSA	MFSA	Yes – Binding:	Yes (BTL-residential for

Country	Macroprudential authorities	Supervisory authority for credit institutions	Supervisory authority for pension funds and insurance companies	Supervisory authority for investment funds and asset managers	Supervisory authority for markets	Legal framework for BBMs on RRE and, if applicable, authority responsible for their adoption	Legal framework for BBMs on CRE and, if applicable, authority responsible for their adoption
	Malta	Services Authority (MFSA) (LSIs)				LTV-O; DSTI-O; maturity caps – adopted by CBM	legal persons only)
Netherlands	De Nederlandsche Bank (DNB) is the designated macroprudential authority for CRR/CRD tools; system-level coordination happens via the Financial Stability Committee (FSC) (members: DNB, AFM, Ministry of Finance, with CPB as external expert)	ECB (SIs) + DNB (LSIs) + AFM (conduct)	DNB + AFM (conduct)	DNB + AFM	AFM	Yes – binding: LTV hard cap, LTI/DSTI limits, adopted by the Ministry of Finance	No
Poland	Financial Stability Committee (KSF), comprising the Ministry of Finance, Narodowy Bank Polski (NBP), the Polish Financial Supervision Authority (KNF), and the Bank Guarantee Fund	KNF	KNF	KNF	KNF	Yes – Non-binding: recommendations under the "comply or explain" approach on LTV, DSTI and maturity limit, adopted by the KSF	No (but CRE supervisory guidance)
Portugal	Banco de Portugal (BdP) The National Council of Financial Supervisors (with representatives from the financial supervisory authorities and Ministry of Finance) plays an advisory role to BdP	ECB (SIs) + BdP (LSIs)	ASF (Portuguese Supervisory Authority for insurance and pension funds)	CMVM (Portuguese Securities Markets Commission)	CMVM	Yes – Non binding: LTV caps, DSTI cap, maturity limits for housing loans, adopted by BdP	No
Romania	The National Committee for Macroprudential Oversight (CNSM) is the macroprudenti	NBR	ASF	ASF	ASF	Yes – Binding: DSTI and LTV limits, adopted by the CNSM	No

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	al authority, comprising Banca Națională a României (NBR), the Financial Supervisory Authority (ASF), and the Ministry of Finance						
Slovakia	Národná banka Slovenska (Slovakian National Bank) (NBS)	ECB (SIs) + NBS (LSIs)	NBS	NBS	NBS	Yes – Binding: (i) LTV; (ii) DSTI; (iii) DTI; and (iv) loan maturity limit, adopted by NBS Decrees	No
Slovenia	Banka Slovenije (Bank of Slovenia) in cooperation with the Financial Stability Board (includes BS, AZN, Ministry of Finance and ATVP)	ECB (SIs) + Banka Slovenije (LSIs)	AZN (Insurance Supervision Agency)	ATVP (Securities Market Agency)	ATVP	Yes – Binding: (i) DSTI; (ii) maturity limits for consumer loans; (iii) LTC for bridge loans secured by financial institutions; Non-binding: (i) LTV; LTV for primary RRE; adopted by Banka Slovenije	No
Spain	Banco de Espana (BdE) + AMCESFI (Autoridad Macroprudencial Consejo de Estabilidad Financiera)	ECB (SIs) + BdE (LSIs)	DGSyFP (Dirección General de Seguros y Fondos de Pensiones)	CNMV (Comisión Nacional del Mercado de Valores)	CNMV	Yes (legal framework exists, but not active) – adopted by Banco de Espana	Yes (legal framework exists, but not active) – adopted by Banco de Espana
Sweden	Swedish Financial Supervisory Authority (Finansinspektionen: FI),	FI	FI	FI	FI	Yes – Binding: amortisation and LTV-linked rules, adopted by the FI	No
Norway	Ministry of Finance, with Norges Bank and Finanstilsynet (Financial Supervisory Authority of Norway) having advisory roles	Finanstilsynet	Finanstilsynet	Finanstilsynet	Finanstilsynet	Yes – Binding: LTV and DTI, adopted by the Ministry of Finance	No (capital-based tools applied)
Iceland	Seðlabanki Íslands (Central Bank of Iceland) (CBI)	CBI	CBI	CBI	CBI	Yes – Binding: LTV and DSTI, adopted by the CBI	No

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Liechtenstein	Financial Stability Council (FSC) is the central macroprudential body; the Government (as designated authority) decides on instrument use; FMA Liechtenstein is the competent authority for implementation	FMA	FMA	FMA	FMA	Yes – Non-binding: (i) LTV cap, (ii) amortisation limits, (iii) affordability test, adopted by FMA and FSC, in collaboration with the Government	No

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