Banks' collateral valuation for commercial real estate loans: lessons from AnaCredit

Federica Ciocchetta – Raffaella Pico – Ivan Quaglia*

Overview

This note presents an analysis of collateralized CRE loans extended by Italian banks to non-financial corporations, using the granular information reported in AnaCredit. First, it provides insights into how frequently banks update real estate collateral values, by comparing their reported valuations over time with changes in market prices. It then proposes simple simulation exercises to assess the impact of hypothetical declines in collateral prices on loan-to-value ratios and on expected losses on banks' CRE portfolios.

The findings of the analysis indicate that the value of real estate collateral for CRE loans is frequently revalued. While the revaluations do not seem to be fully in line with changes in average market prices, deviations are contained and might be influenced by the fact that aggregate market prices do not fully capture the heterogeneity of real estate characteristics. The results of the simulations show that the risks for the Italian banking system associated with both baseline and (various) adverse assumptions for real estate price developments are generally contained. Indeed, the increase in expected losses on CRE loans would remain moderate even in case of a sharp decline in property prices (larger than that observed historically) and a significant increase in the probability of default of the non-financial firms to which the collateralized CRE loans have been extended.

*   Directorate General for Economics, Statistics and Research.

Introduction and main conclusions

As seen in many countries during the global financial crisis, adverse real estate price developments can pose significant risks to financial stability and negatively impact banks' resilience (Agnello and Schuknecht, 2011; Claessens et al., 2009; Mian and Sufi, 2014; Cerutti et al., 2015). Combined with a high borrowing costs and a weak economic outlook, a decline in property prices could result in an increase in borrowers' defaults and credit losses for banks. In light of these developments, there is a growing concern among policymakers and regulators about the potential impact of a downturn in the real estate market, especially in the commercial real estate sector (CRE), on the financial system and the broader economy.

This note presents an analysis of collateralized CRE loans, as defined by the Recommendation ESRB/2019/03, granted to non-financial corporations (NFCs). It is worth noting that collateral includes not only non-residential immovable properties (such as offices, commercial premises and industrial plants), but also residential ones, provided that they are associated with a loan granted to a legal entity. To gain insights into the valuation of real collateral by banks in Italy, we utilize granular information collected in AnaCredit, comparing banks' reporting of the real estate collateral valuations over time with observed changes in market prices.

The value update policy following real estate price movements has an impact on the denominator of the current loan-to-value ratio (LTV-C) associated with a given contract. As the LTV-C is a key variable to assess the vulnerability of banks toward the real estate sector, we then examine the distribution and breakdowns of this indicator. Finally, we propose a simple simulation exercise to assess the impact of expected and hypothetical drops in real estate prices on LTV-C and on expected losses in banks' CRE loan portfolios. The work focuses on the share of loans with a LTV-C greater than 80 per cent (hereafter referred to as 'high LTV-C loans') as these are associated with greater losses in the event of default and possibly to a higher probability of default (Mokas and Nijskens, 2019).

The main results of the analysis are the following:

- **AnaCredit data show that the value of real estate collateral are frequently revalued**. Between 2019 and 2023, the revaluations would have affected approximately 70 per cent of the properties used as collateral each year, a relatively high share in international comparison (Horan *et al.* 2023). While the revaluations do not seem to be fully in line with changes in average market prices, deviations are contained. In line with the mild downward trend in prices in the non-residential real estate market and due to the predominance of these properties in the collateral, over 50 per cent of the real estate collateral experienced downward revaluation changes between 2019 and 2023. Deviations from the price trend might be influenced by the fact that aggregate market prices do not fully capture the heterogeneity of real estate characteristics.

- **In December 2023, the average LTV-C was 55 per cent, slightly lower than the 60 per cent recorded in December 2019**. The share of high LTV-C loans over total CRE loans was about 13 per cent (11 per cent if we consider only performing loans).

- **Simulation exercises show that the risks for the Italian banking system associated with both baseline and (various) adverse assumptions for real estate price developments are generally contained**: the share of loans with a high LTV-C would increase to more than 16 per cent if we apply a large and differentiated shock to the office and commercial property segment. Indeed, the increase in expected losses on CRE loans would remain moderate even in case of a sharp decline in property prices (larger than that observed historically) and a significant increase in the probability of default of the non-financial firms to which the collateralized CRE loans have been extended.

The rest of the note is structured as follows. Section 1 reports a description of collateralized CRE loans. Section 2 offers insights into AnaCredit valuations and section 3 presents the analysis of LTV-C and the results of the simulation exercise.

1. Insights on CRE loans and collateral

The analysis relies on AnaCredit, a harmonized and granular database with detailed information on a sample of bank loans granted to legal entities. Our dataset focuses on collateralized CRE loans to NFCs by Italian banks.[1] The data are analyzed according to different breakdowns, including: the type of property (residential,[2] offices and commercial premises, other commercial properties); the economic sector of the borrower (construction firms, real estate companies, other firms); the loan purpose; the geographical area where the property is located (for further details see Annex A.1).

In December 2023 the total amount of collateralized CRE loans collected in AnaCredit was about 13 per cent (68 billion of euros) of total loans to NFCs, with 38 billion of loans associated with offices and commercial premises (figure 1a). About 30 per cent (20 billion euro) of collateralized CRE loans are backed by other commercial collateral and only a small part (16 per cent, about 11 billion euro) by residential (RRE) collateral.

A mere 15 percent of collateralized CRE loans are granted to construction firms, about 30 per cent to real estate companies and the majority to firms of other economic sectors (figure 1b). CRE loans are mainly collateralized by commercial property (e.g. offices, commercial premises like shops, and other commercial

---

[1] The CRE loans collected in AnaCredit are about the 75 per cent of CRE loans reported in Finrep, for both collateralized and total CRE loans.

[2] In line with the ESRB definition, all real estate protections in AnaCredit can be considered CRE if they are owned by legal entities dend not by households, in which case the resldential properties should be classified as CRE, type residential. An example is a dwelling property under development and pledged as collateral by a construction firm.

properties like industrial plants) but for construction firms the share of residential property is slightly higher than for the other two borrower categories. Commercial properties are the main collateral also of loans granted for the purpose of financing properties 'under development', which do not exist at the contract origination ('construction investment'; figure 1c), which represent only a small share of the total. The largest share of real estate collateral is located in the North while offices and commercial premises are the largest part of real estate collateral in all the geographical areas (figure 1d).

Figure 1: characteristics of CRE loans
(billions of euros for panel a; per cent for panels b-d; December 2023)

a) Type of property

b) Economic sector

c) Loan purpose: construction investment

d) Geographical area

Source: AnaCredit. Note: Only CRE loans collateralized by a real estate property. In the case a CRE loan is associated with more than one type of collateral, we assigned the loan to the type with the largest value. Panel b: the three categories have been identified by using the ATECO code. 'Construction' includes enterprises classified under ATECO 41, 42, 43; 'Real estate' under ATECO 68 ('Rental and management of owned or leased properties'); 'Others' the remaining sectors.

As illustrated in figure 2, there is certain heterogeneity of CRE exposures across banks. In December 2023, on average a 6.5 per cent of bank total loans was collateralized by a real estate property; approximately 50 per cent of all banks had a CRE loan share of less than 10 per cent of total loans, which corresponds to approximately 80 per cent of total banking system assets. Only 10 per cent of all banks have a share of CRE loans exceeding 20 per cent.

Figure 2: CRE exposure by bank
(billions of euros and numbers; December 2023)
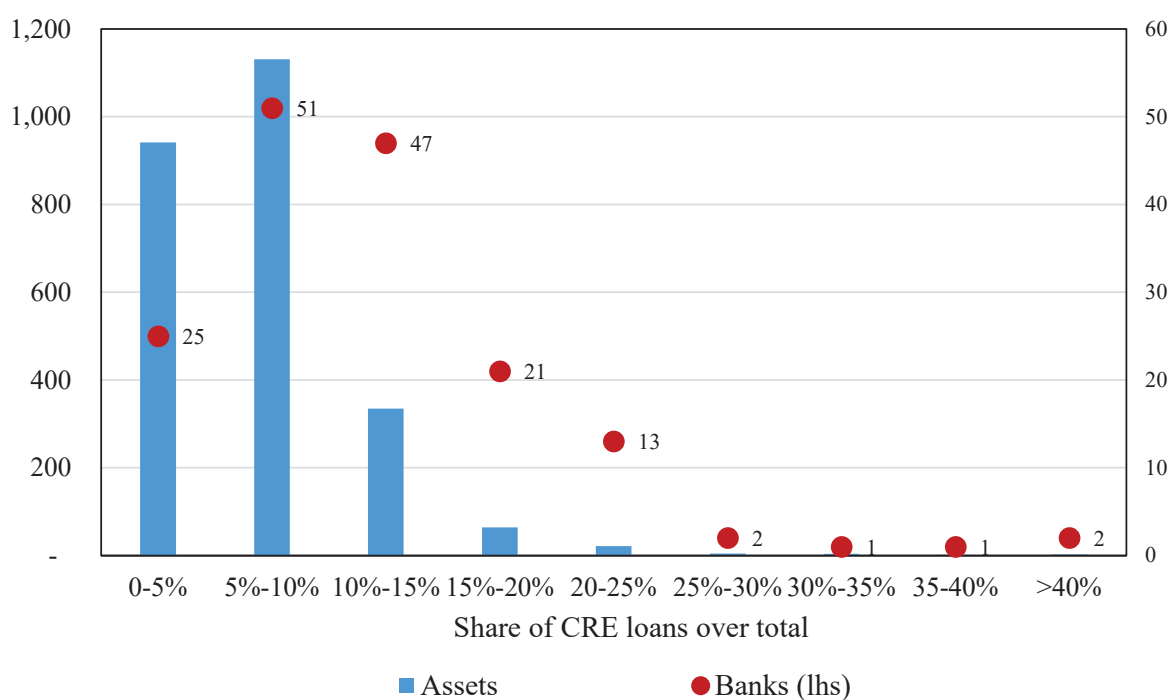
Source: Finrep and supervisory report. The data are on a solo basis.

2. Collateral valuations according to AnaCredit

In this section, we investigate changes in banks' valuation with respect to the dynamics of real estate price indices to investigate how banks update the collateral values reported in AnaCredit.

In accordance with EU regulations and supervisory guidelines banks are required to update the collateral value periodically. The Capital Requirements Regulation (CRR) art. 208 regulates requirements for immovable property collateral to be eligible for the risk mitigation. Specifically, some requirements regard the monitoring of collateral values over time and the valuation approaches. Institutions have to monitor the value of property on a regular basis and, at a minimum, once every year for commercial immovable property and once every three years for residential property. Moreover, the property valuation is reviewed when information available to institutions indicates that the value of the property may have declined materially relative to general market prices (for details see Annex A.2). For the analysis of property valuation, we consider the variable 'protection value' (PV) reported in AnaCredit, which is the value of the real estate property, generally the market value assessed by the bank and updated periodically. This value should change over time reflecting the changes in market prices.

Concerning the price trends, since 2019 house prices in Italy have consistently increased, although less than in the rest of Europe (figures 3a and 3b). Conversely, non-residential property prices have been declining for at least a decade although with some heterogeneity: office and retail properties decreased more than the industrial segment.
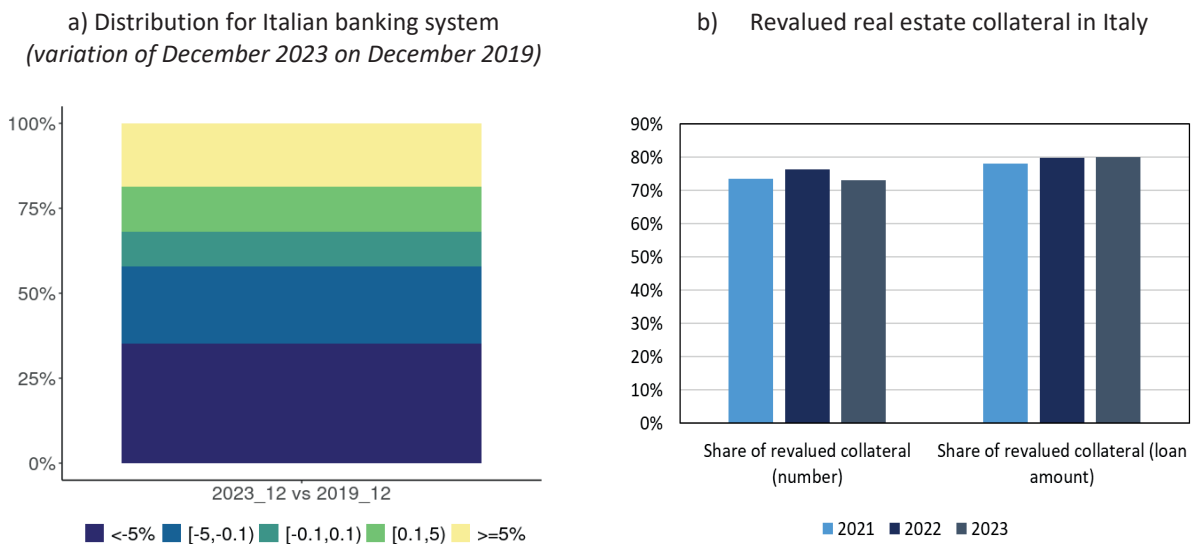
Figure 3: Real estate price developments
(Indices 2019 =100)

a)   Residential real estate

b)   Non-residential real estate
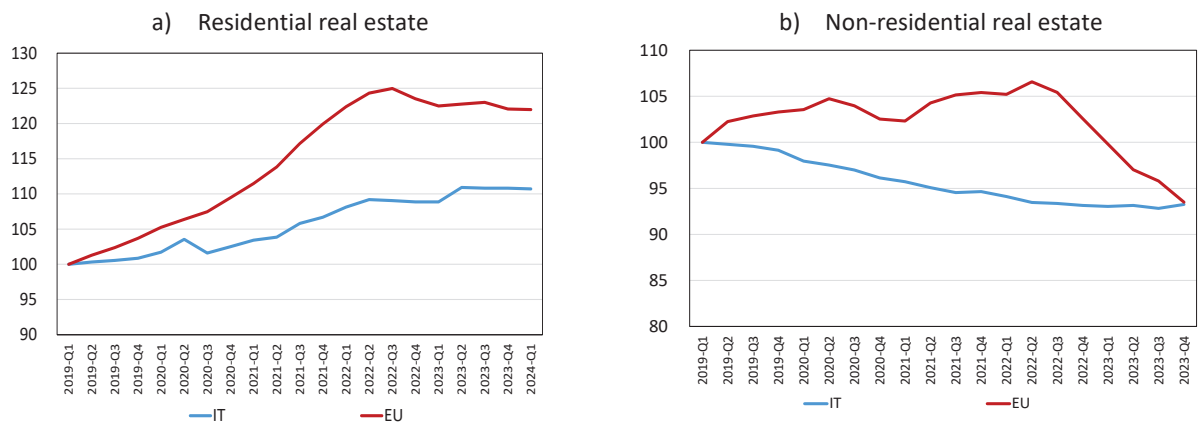
Source: ECB SDW, OECD. Note: For non-residential properties, the indices are based on non-harmonized data and they are not fully comparable.

Figure 4a summarizes the change in valuation of AnaCredit collateral at the system level. In line with the mild downward trend in prices in the non-residential real estate market and due to the predominance of these properties in the collateral, over 50 per cent of the real estate collateral experienced downward revaluation changes between 2019 and 2023. Overall, the change in valuations for each year has involved about 70 per cent of collateral in AnaCredit (figure 4b); this percentage is high in the comparison with other EU countries (Horan et al., 2023).

Figure 4: Collateral valuation

a) Distribution for Italian banking system
(variation of December 2023 on December 2019)

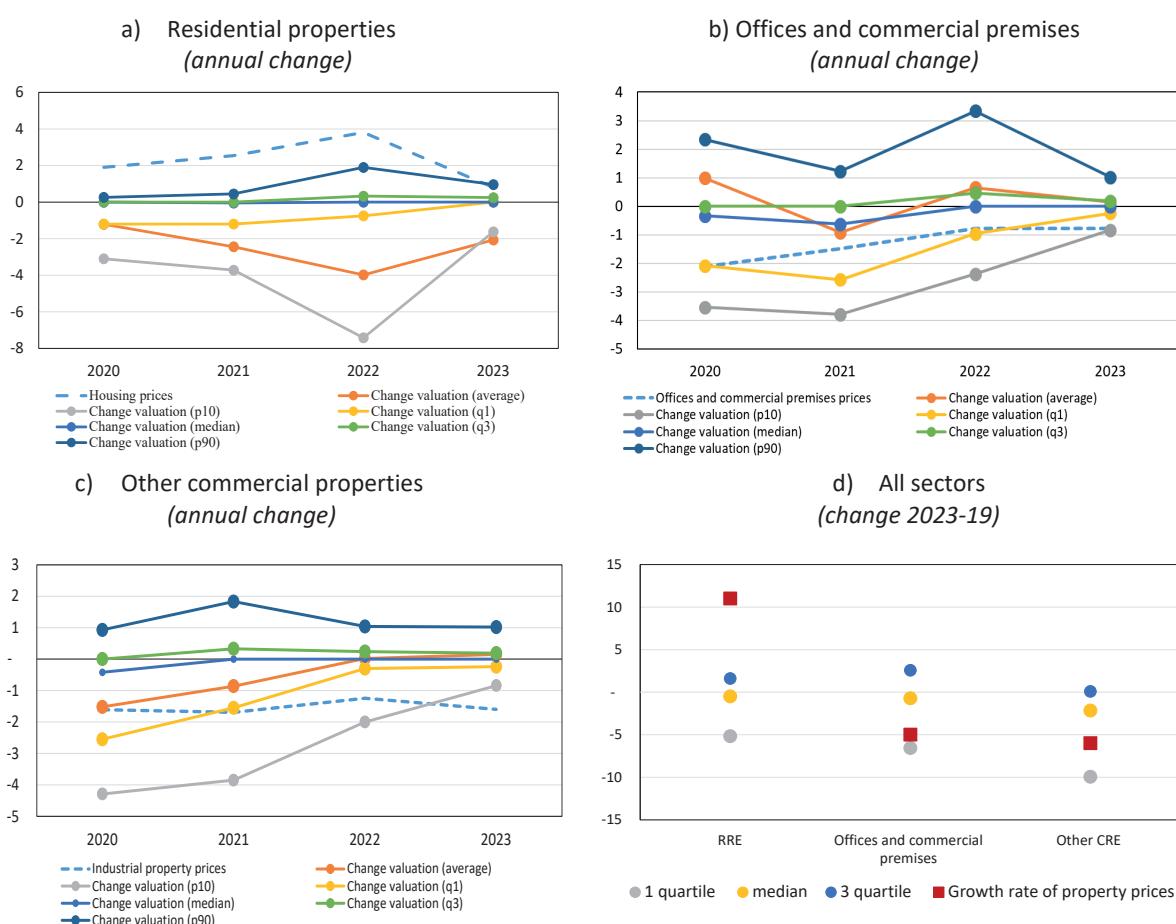b)   Revalued real estate collateral in Italy

Source: AnaCredit. Note: We calculate the valuation change at the level of single collateral/instrument; the charts report the share of collateral properties in each revaluation class (i.e. whose valuation change is a given interval). We exclude NPL from the analysis.

The evidence is confirmed when we look at the breakdowns (figure B.1 in the Annex B): the median valuation change from December 2019 to December 2023 remains consistently around minus 1 per cent, with some negative peaks, particularly in the construction sector

(2 per cent decline). Conversely, there are observable instances of upward revaluation changes in both the East and West areas of the Northern part of Italy.

More in detail, figure 5 compares average market price dynamics with changes in banks' valuation, plotting growth rates in real estate property price index against value adjustments of collateral items, by different sub-segments (fig. 5, panels a, b, c), both on year-o-year basis and over the period 2019-23. According to the AnaCredit report, banks update real estate property valuations, although the change is generally lower compared to change in the property price index. In the case of the residential segment all changes in valuations are below that of the property price index; in the case of the commercial segment, on the other hand, it appears that the value of properties pledged as collateral for loans has partially reflected the depreciation recorded in the market on average. Similar results can be observed for the change over the period of 2019-23 (fig. 5d).

Figure 5: real estate price indices and revaluations by type of property
(Per cent)

a) Residential properties
(annual change)

b) Offices and commercial premises
(annual change)

c) Other commercial properties
(annual change)

d) All sectors
(change 2023-19)

Source: OMI, AnaCredit. Note: We calculate the series of price indexes for offices and commercial premises as the average of the process of the two segments, respectively. In the case of other CRE, the series refers to the industrial segment. We consider the collateral only for loans in the performing status.

The differences between AnaCredit revaluation and property price indexes may depend on a number of factors. First, we use a measure for the price change at the

aggregate level that might not capture well the valuation dynamics of the three groups of collateral identified. Second, at the granular level, collateral value reflects specific characteristics such as whether the property is an old building, a new one or under construction, the property location or the quality of the building, for instance in terms of energy efficiency class; this can be especially true for the RRE properties used as collateral for CRE loans. Third, the assessment of the market value can be based on long-term considerations that keep the value constant for a while. In the case the loan is in the performing status, a common bank practice for updating collateral valuation is to apply statistical approaches; valuations are reviewed only in the case of significant difference relative to general market prices.

Overall, the updates of the collateral values reported in AnaCredit seem to reflect the price developments over time. In this sense, collateral-based indicators (such as LTVs), constructed using these data, are consistent with price index changes and are appropriate for analyzing CRE loans (see Annex A.3 and Chart B.2).

3. The impact of collateral revaluation on the current loan-to-value ratio

3.1 LTV-C

The LTV-C is a key variable to assess the vulnerability of banks toward the real estate sector: a high value of LTV-C is associated with higher losses in the event of default and, ex-ante, with a higher probability of default (Mokas and Nijskens, 2019).

The bank policy for collateral value update following real estate price movements affects the denominator of this indicator, which also changes at the numerator for the repayment of the debt. Based on AnaCredit data, it is possible to calculate the LTV-C for each loan to explore heterogeneities and risk concentration.

At a given reference date the LTV-C at the loan level is:

$$LTVC_{i,t} = \frac{Loan_{i,t}}{\sum_{j=1}^{n} Value_{j,i,t}}$$

where $loan_{i,t}$ is the residual amount of the loan i granted by a given bank at time t and at the denominator we consider the sum of all properties values j associated to the loan i, at the current value reported in t.

In AnaCredit there are two possible attributes for the collateral value: the protection value (PV) and the protection allocated value (PAV, see figure B.3 in the Annex B). PV is the monetary value of the protection item that was established at the latest valuation date prior to the reporting reference date; it reflects the total value of the protection. PAV is instead the maximum amount of the PV available as credit protection for the

instrument[3] based on banks' internal risk management considerations. In the following, we consider the LTV-C with PAV, as similar to the approach used by banks and more conservative with respect to use the (market) property value.

In December 2023, the average LTV-C was 55 per cent, in a decreasing trend from the 60 per cent in 2019 (figure 6a); a certain heterogeneity can be observed across different breakdowns (figure 6, panels b-d). The LTV-C is higher for construction firms and for loans whose purpose is construction investment. By geographical area, the LTV-C is higher for properties in the North-East.

**Figure 6: LTV-C: distribution and breakdowns**
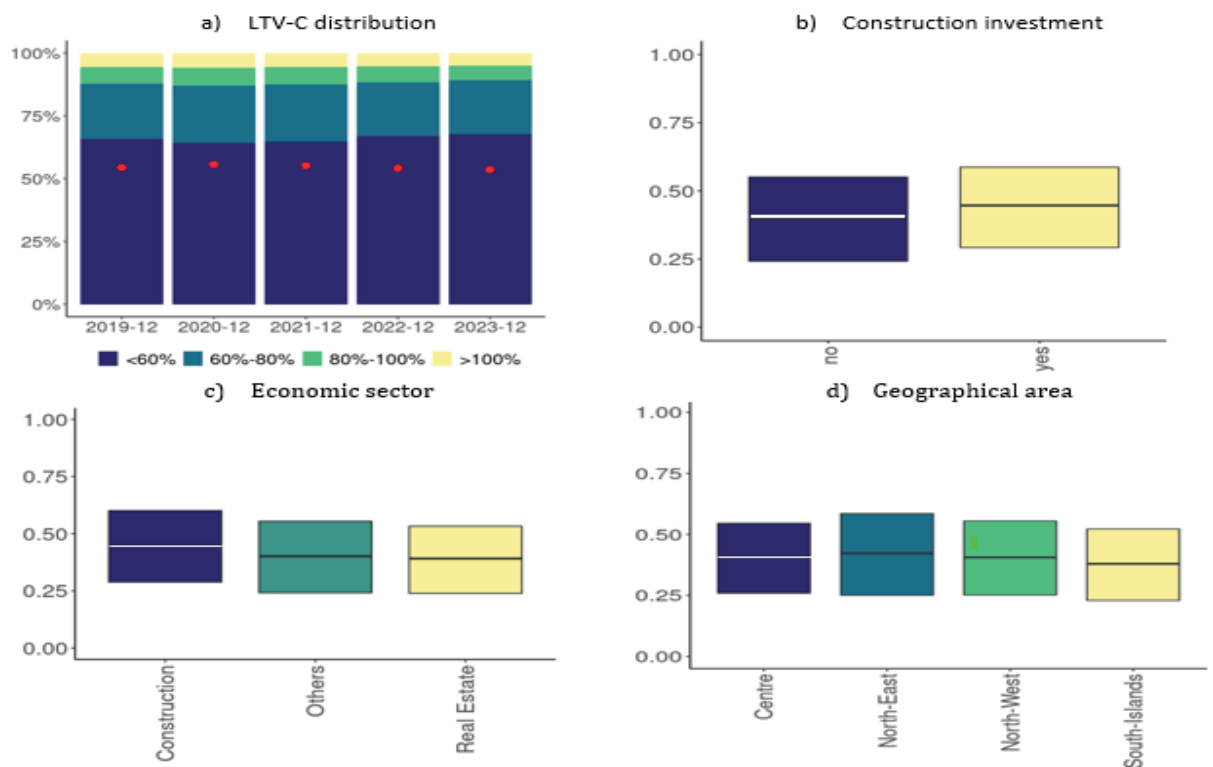
Source: AnaCredit data. Note: NPL are included only in panel a. We calculate LTV at the instrument levels by using the protection allocated value at the denominator. Panel a: the red point indicated the weighted average of LTV-C by loan amount. The same chart for only performing loans is reported in the Annex B (figure B.4). Panels b-d: each figure represents the distribution of LTV in December 2023, total and for each value of the variable of interest (construction investment, borrower type and geographical area). The central line of each box-plot represents the median value, the bottom and upper lines of the box the 1st and 3rd quartile. The values outside the inter-quantile interval are not shown.

The distribution of LTV-C varies across banks (figure 7). The LTV-C are higher for cooperative banks and lower for other categories. In terms of distribution of the indicator, we should pay particular attention to high LTV-C loans as they are generally considered riskier and can be related to greater losses in case of defaults, especially in the case of a strong drop in property valuations.

---

3   AnaCredit states that, in order to determine a protection allocated value, an intermediary follows the collateral allocation principles used internally for risk management purposes. In this respect, AnaCredit does not provide any standard allocation algorithm for determining the protection allocated value.

Figure 7: LTV-C by bank category
(December 2023)
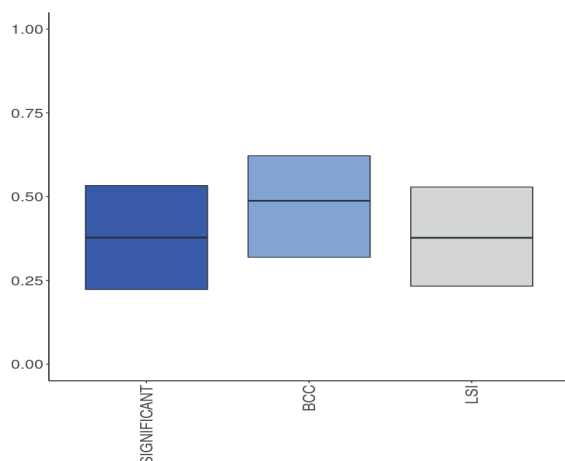
Source: AnaCredit. Note: LTV is calculated at the instrument level by using the protection allocated value at the denominator. The four bank categories include: 1) Significant banks; 2) BCC (including banks belonging to the two cooperative groups – ICCREA and CCB – and other cooperative banks not belonging to them); 3) LSI (excluding cooperative banks). The central line of each box-plot represents the median value, the bottom and upper lines of the box the 1st and 3rd quartile. The values outside the inter-quantile interval are not shown.

Figure 8: LTV-C greater than 80 per cent by property type
(Per cent; December 2023)
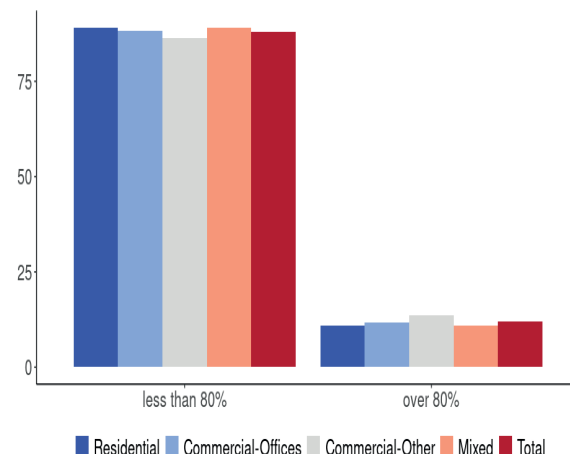
Source: AnaCredit. Note: We distinguish CRE loans in terms of the type of collateral. We consider also a mixed category corresponding to the case of different types of property used as collateral. See figure B.5 for results in terms of amount.

In December 2023, the share of high LTV-C loans is 12 per cent of the overall CRE portfolio at the aggregate level (corresponding to 10 billion, figure 8); a similar share can be observed across loans with different types of collateral. Banks with a high share of LTV-C above 80 per cent have generally a low share of CRE exposure in their loan portfolio.

3.2 Simulation analysis

In this section, we describe a static simulation exercise to assess the impact of a decline in real estate values on the LTV-C distribution, in particular on the share of high LTV-C loans, and consequently on the estimation of the LGD and expected losses related to CRE loan portfolios, for the whole banking system. We estimate the impact under different hypotheses on the property valuation developments; we consider the following assumptions on property prices ('scenarios', Table 1[4]):

1) Baseline: the shock to real estate prices consists of a small increase in the house prices and a slight decline for non-residential real estate prices.

2) Mildly adverse: a shock to real estate prices of -5 pp, similar to the highest annual decrease of property prices observed in the past (over the period 2004q1-2023q4).

---

[4] The magnitude of the shocks is defined taking into account historical values of property price (over the period 2004q1-2023q4) and Banca d'Italia forecasts of house prices. For the baseline scenario, in the case of non-residential properties no forecasts are available and we assume a slight negative growth rate of prices, in line with the latest observations. Scenario 4 is high adverse and never realized in the past. A higher drop for commercial properties prices (-15 per cent over the years 2023-2024) are presented in Martini *et al.* 2023.

3) Differentiated shock: the shock is greater for offices and commercial premises (-15 per cent), whereas it is limited for other commercial properties (-2 per cent) and high for residential properties (-5 per cent).

4) Highly adverse: the shock on real estate valuation is of -10 per cent, twice as large as the maximum annual price decline observed historically (over the period 2004q1-2023q4).

Table 1: summary of different scenarios of price shocks		
Scenario	**Prices**	**Property categories**
1. Baseline	+1 per cent for residential and -0.5 per cent for other properties	Differentiated shock depending on property type
2. Mildly adverse	-5 per cent	Same shock to all properties
3. Differentiated shock	-5 per cent for residential, -15 for offices and commercial premises, -2 for other commercial	Differentiated shock depending on property type
4. Highly adverse	-10 per cent	Same shock to all properties

The starting point of the exercise is the stock of all outstanding performing loans as of December 2023 and with a residual maturity greater than 1 year. The exercise is static, i.e. the stock of loans remains fixed and in the performing status throughout the analysis period. In addition, we do not amortize the loan in the LTV numerator.

To assess the impact on the banks' balance sheets, we calculate the expected losses (EL) by using the following formula:

$$EL = PD * LGDs * EAD$$

where PD is the probability of default, LGDs is the loss given default (for the scenario s) and EAD is the exposure at default. The PD value is the one reported in AnaCredit for loans in the IRB portfolio, for which the information is available, in the other cases is equal to the median PD value.[5]

We start with the assumption that the PD is constant in all the real estate price scenarios; we also consider two additional exercises based on different assumptions on PDs: 1) the case of a moderate increase in the PD for the baseline scenario (+2 pp for companies in the construction sector and real estate companies and +1 pp for other economic sectors); 2) a large increase for the highly adverse scenario (+4 pp and +2 pp, respectively). The EAD is given by the outstanding value of the loan in December 2023.

---

[5]   The median of PDs is 2 per cent.

The LGD under scenario *s* is estimated as a function of LTV-C (which depends on property prices), administrative costs related to the litigation procedure and a discounting factor (*Discount*), by using the following formula (similar to the one proposed in Gross, and Población García, 2017 and Jurča et al, 2020):

$$LGDs = costs + MAX\left\{0, \left[1 - \frac{1}{LTVCs} * Discount\right]\right\}$$

The objective of our exercise is to determine the variation in LGD due to the change in the collateral valuation and, consequently, in the LTV-C under different scenarios.

We then estimate the impact of these scenarios on the banks' balance sheets in terms of EL variation. For this purpose, we assume that the administrative costs and the discount rate are constant.[6] Note that the results may underestimate the ELs for a number of reasons, for instance, the simulation does not take into account second-round effects, such as a massive sell-off of collateral, which may cause prices to fall further.

The impact of a shock on real estate valuation, and hence on the LTV-C, is limited in almost all the scenarios and moderate under the most severe assumptions (figure 9a). Compared with the value observed in December 2023, in the baseline scenario the share of high LTV-C loans (green and yellow parts in the figure) for performing loans would remain almost constant to about 11 per cent, as the negative adjustments of valuation

Figure 9: simulation exercise


a) Distribution of LTV-C

b) Expected losses
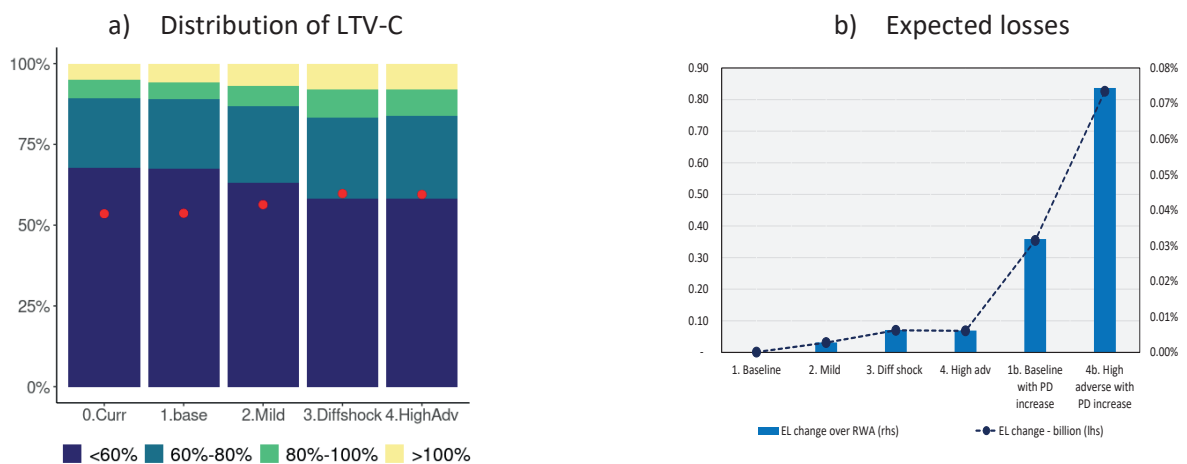
Source: AnaCredit, Corep (on individual-basis). Note: Panel a only performing loans are considered. The red point is the average LTV-C, weighted by loan amount. Panel b: the EL change is calculated for each scenario with respect to the current EL (December 2023). Only performing loans are considered.

---

[6] We calculate the discount factor by the following formula: $1/(1+rate)^T$, where 'rate' is a risk-free interest rates (such as 3-month Euribor, with a possible add-on) and T is the time of disposal. Based on the data in December 2023 about Euribor and the duration of litigation procedure, if we assume administrative costs equal to 30 per cent of the loan amount, the average LGD is 32 per cent, a value consistent with the LGD for the corporate portfolio under the IRB approach reported in Corep. Some insights for the calculation of LGD are reported in EBA 2017.

12

BANCA D'ITALIA · *Notes on Financial Stability and Supervision No. 44 - January 2025*

of non-residential properties offset the positive ones of residential properties. The share would increase by 2 pp in the mildly adverse scenario and to more than 16 per cent in the adverse and differentiated shock scenarios. In the latter, the weighted average of LTV-C rises to 60 per cent, from about 54 per cent in December 2023. The share of loans with LTV-C above 100 per cent rises from 5 per cent observed in December 2023 to 8 per cent under sharp decline in house prices.

Moreover, the variation of the EL under the different scenarios regarding the property prices is very limited (figure 9b), with a value of about 70 million euros for all the banking system (less than 0.01 per cent in terms of RWA) in the case of the high adverse scenario. Only if we also assume that the PDS will change does the increase in EL become moderate: it raises to just above 800 million (about 0.07 per cent in terms of RWA) under the high adverse scenario (scenario 4) combined with a sharp increase of PDs. Some heterogeneity across banks can be observed both in terms of the share of high LTV loans (figure 10) and variation in estimated EL, depending on the initial distribution of LTV-C and on the heterogeneity in the property types used as collateral for CRE loans.

Figure 10: Simulation exercises – distribution of the share of high LTV-C loans by scenario
(Per cent)
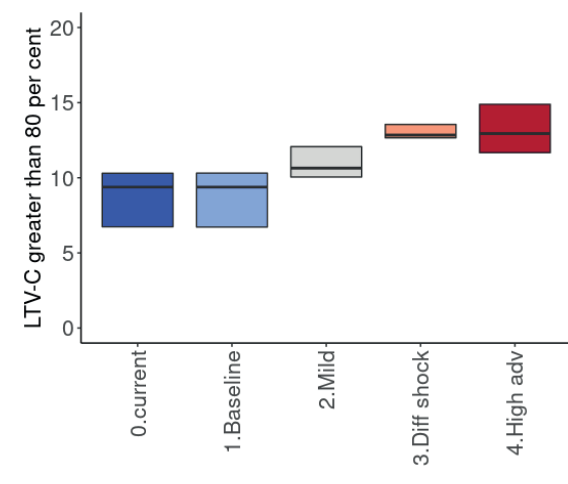
Source: AnaCredit data.

References

Recommendation ESRB/2019/03, *Recommendation on 'closing real estate data gaps'*, emending Recommendation ESRB/2016/14.

ESRB Report (2023). *Vulnerabilities in the EEA commercial real estate sector.*

Agnello, L. and L. Schuknecht (2011). *Booms and busts in housing markets: Determinants and implications.* Journal of Housing Economics, Vol. 20(3): 171-190.

Cerutti, E., J. Dagher and G. Dell'Ariccia (2015). *Housing Finance and Real Estate Booms: A Cross Country Perspective.* IMF Staff Discussion Note.

Claessens, S., K.M. Ayhan and M.E. Terrones (2009). *What Happens during Recessions, Crunches and Busts?* Economic Policy, Vol. 24(60): 653-700.

EBA 2017, *Final Guidelines on PD and LGD estimation*, Guidelines EBA-GL-2017-16.

Gross, M. and J. Población García (2017). *Assessing the efficacy of borrower-based macroprudential policy using an integrated micro-macro model for European households.* Economic Modelling, Vol. 61: 510-528.

Horan, A., B. Jarmulska and E. Ryan (2022). *Understanding banks' response to collateral value shocks – insights from AnaCredit and the COVID-19 shock in commercial real estate (CRE) markets.* ECB Macroprudential Bulletin, N. 19, October 2022.

Horan, A., B. Jarmulska and E. Ryan (2023). *Asset prices, collateral and bank lending: the case of Covid-19 and real estate.* ECB Working paper series N. 2823.

Jurča, P., J. Klacso, E. Tereanu, M. Forletta and M. Gross (2020). *The Effectiveness of Borrower-Based Macroprudential Measures: A Quantitative Analysis for Slovakia.* IMF working paper N. WP/20/134.

Martini, M., P.E. Uriel and A. Jobst (2023). *European commercial real estate – selectivity matters!*, Allianz Research Report.

Mian, A. and A. Sufi (2014). *House of Debt.* University of Chicago Press, Chicago.

Mokas, D. and R. Nijskens (2019). *Credit Risk in Commercial Real Estate Bank Loans: The Role of Idiosyncratic versus Macro-Economic Factors.* De Nederlandsche Bank Working Paper N. 653, Available at SSRN: https://ssrn.com/abstract=3448455 or http://dx.doi.org/10.2139/ssrn.3448455.

Ryan, E., A. Horan and B. Jarmulska (2022). *Commercial real estate and financial stability – new insights from the euro area credit register*, ECB Macroprudential bulletin, N. 19, October 2022.

Annex A: Technical notes

A.1 Breakdowns. The note refers to the following breakdowns:

- Type of property: i) residential; ii) offices and commercial premises; iii) other commercial (for instance, industrial plants).

- Economic sector of the borrower distinguishing among: i) construction firms; ii) real estate companies; iii) other firms. The first two categories include entities whose activities are concentrated in the real estate market and possibly more exposed to negative developments of the sector. They can be considered as a proxy of the income-producing RE activities (i.e. the construction/selling of properties and rental housing) proposed by ESRB Recommendation. The 'other' class includes firms that generally use properties for their own business.[7]

- Construction investment:[8] the breakdown refers to loans granted for the purpose of investing in construction, including purchase of the land on which the building, infrastructure and industrial facilities are constructed. In other words, the selection identifies loans associated to properties 'under development', which do not exist at the time of financing.

- Geographical area where the property is located.

- Lender: we consider both aggregate results for 3 categories of banks.[9]

A.2 Property valuation in the EU regulation. On the base of the Capital Requirements Regulation (CRR) art. 208 institutions have to monitor the value of property (eligible for risk mitigation) on a frequent basis and, at a minimum, once every year for commercial immovable property and once every three years for residential property. The property valuation has to be reviewed when available information indicates that its value may have declined materially relative to general market prices. For loans exceeding 3 million euros or 5 per cent of the institution funds, the property valuation shall be reviewed at least every three years. Institutions may use statistical methods to monitor the value of the immovable property and to identify immovable property that needs revaluation. Rules on the frequency of valuations and on valuation methodology of collateral securing NPLs are more stringent factors (par. 7, ECB NPL Guidance 2017); for this reason, we exclude NPLs in analysis.

A.3 Robustness check on LTV-C. To test the robustness of the LTV-C in AnaCredit, we compare it with an alternative indicator, where the numerator is the residual loan amount in AnaCredit and the value in the denominator is the collateral value at origination adjusted by considering the y-o-y market price changes, distinguishing

---

[7] This is just a proxy; other kinds of firms in the manufacturing can be involved directly in the real estate sector.

[8] CRE loans with the purpose of 'Construction investment' are about 30 per cent in terms of amount and about 40 per cent in terms of instrument number; half of these are granted to construction and real estate firms, with the vast majority of the rest going to service company.

[9] The three categories include: 1) Significant banks (excluding ICCREA and CCB groups); 2) BCC (the two banking groups – ICCREA and CCB – and other cooperative banks not belonging to them); 3) LSI (excluding cooperative banks).

among the type of property used.[10] We focus on loans granted since 2019, for which we have all the information at origination (around one third of all loans considered in our analysis). The results show that the difference in the share of high LTV-C loans between the two indicators is limited (figure B.2).

Annex B: Additional Figures and Tables

Figure B.1: valuation review by breakdowns
(December 2023 on December 2019; per cent)

a) borrower sector b) construction investment c) geographical area
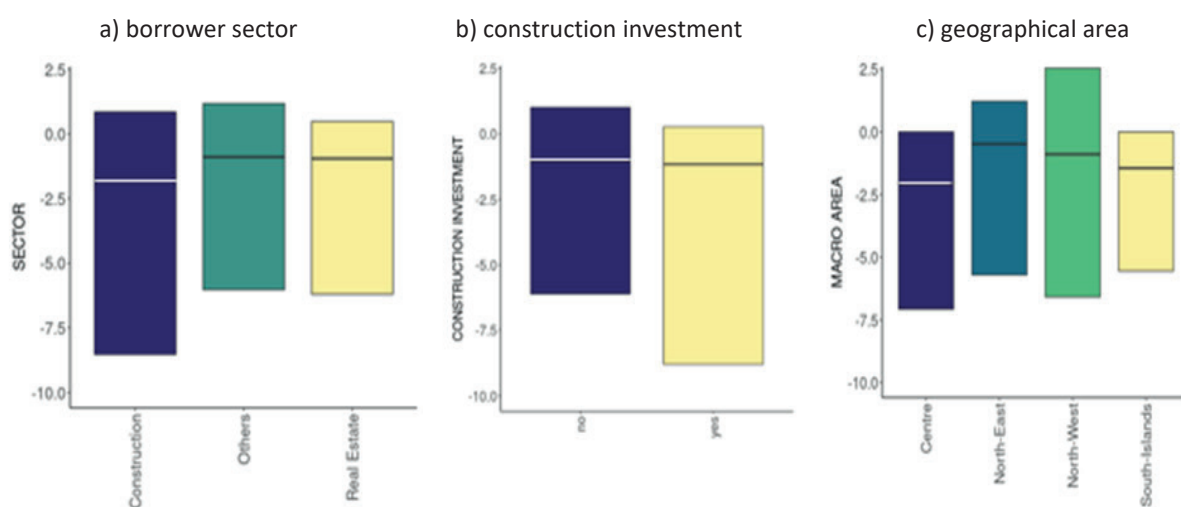
Source: AnaCredit. Note: NPL are excluded from the analysis. Each figure represents the distribution of valuation reviews by the variable of interest (borrower type, construction investment and geographical area). The central line represents the median value, the bottom and upper lines of the box the 1st and 3rd quartile. The values outside the inter-quantile interval are not shown.

---

[10]   Given a loan with a collateral h of type k (residential, offices or other commercial) originated in the year 2019, the adjusted collateral value in 2023 can be estimated as $Value\_h\_23 = V\_h\_0*(1+change\_k\_20\_19)*(1+change\_k\_21\_20)$ $*(1+change\_k\_22\_21)*(1+change\_k\_23\_22)$, where V_h_0 is the value at the origination reported in AnaCredit and $change\_k\_x\_y$ is the annual growth rate in the year x for the property type k.

Figure B.2: Loans with high LTV-C – comparison between different current values of collateral
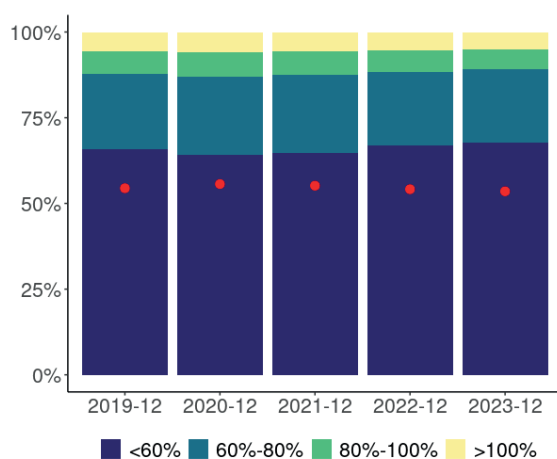### (Per cent; December 2023)
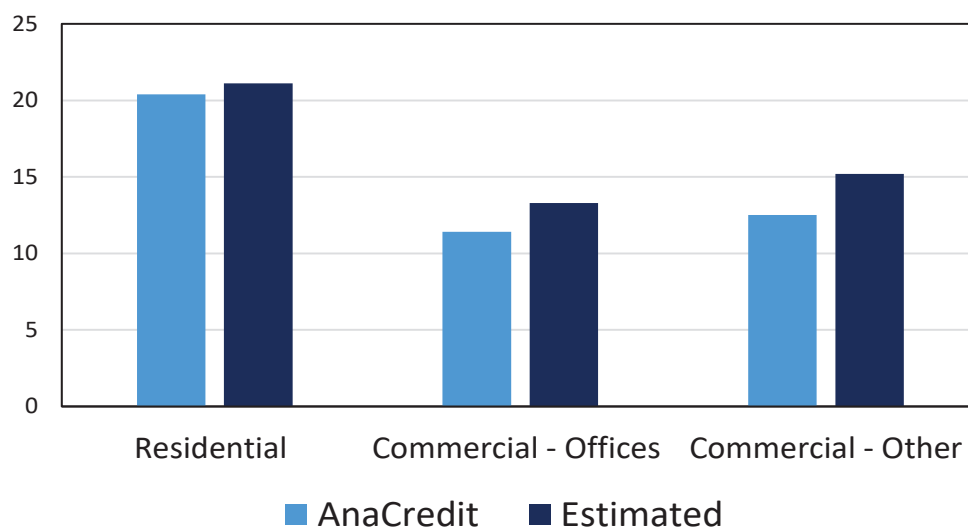
Source: AnaCredit. Note: The chart shows the share of high LTV-C loans in the case LTV-C is calculated by using AnaCredit data ('AnaCredit') and in the case the indicator is calculated by applying market prices changes to the collateral value at origination ('Estimated'). Only loans generated since 2019 are considered in the analysis.

Figure B.3: LTV definitions
(Per cent)

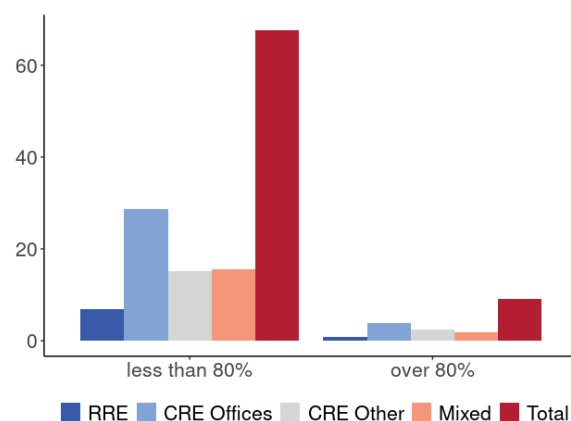a) Protection value (PV)   b) Protection allocated value (PAV)
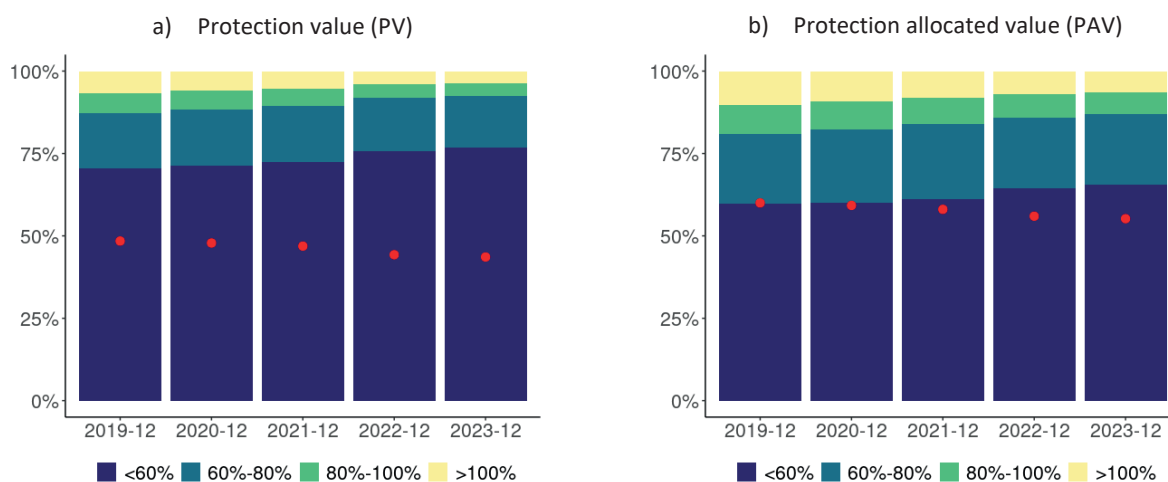
Source: AnaCredit. Note: NPL are included in the calculation. The red point indicated the weighted average of LTV-C by loan amount. LTV is calculated at the instrument levels by using two different definitions (panels a and b). In the case of PAV the LTV-C is consistently higher and the main impact is on the LTV lower than 60 per cent; the average LTV-C is 55 per cent in December 2023, in a decreasing trend form 60 per cent, about 12pp higher than the case of PV. In both cases at the numerator we report the loan value, excluding overdrafts and the undrawn amount, as stated in the ESRB Recommendation. If we focus only on performing loans, the main figures are similar (figure B.4): in the case of PAV the weighted average become 54 per cent and the share of loans greater than 80 per cent is 7.3 per cent (instead of 9.8).

Figure B.4: LTV-C distribution – only performing loans

Source: AnaCredit. Note: Only performing loans are included. The red point indicated the weighted average of LTV-C by loan amount.

Figure B.5: LTV-C greater than 80 per cent
(billions of euros; December 2023)

Source: AnaCredit. Note: We distinguish CRE loans in terms of the type of collateral. We consider also a mixed category corresponding to the case of different types of property used as collateral.