

# Systemic risks of commercial real estate funding in Austria

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Commercial real estate (CRE) has come under increasing scrutiny by macroprudential as well as microprudential authorities. Our policy paper is embedded in macroprudential policymaking in Austria and informs market participants on the current state of play.

In Austria, bank loans account for the majority of CRE exposures. Furthermore, Austrian banks are more exposed to CRE than banks in other EU banking markets. The growth of aggregate CRE lending to domestic borrowers is elevated, although most Austrian banks remain below critical thresholds. A large share of CRE loans in Austria is undercollateralized and at the same time exhibits high loan-to-value (LTV) ratios. Furthermore, the Austrian banking sector's high exposure to just a few CRE borrowers combined with below-average ratings of CRE loans warrants the heightened attention of both banks and supervisors. However, rating migrations have so far not shown critical patterns.

Research is under way to investigate the reasons behind high LTV and loan-to-collateral ratios, the impact of higher interest rates and/or an economic downturn on CRE market valuations, the adequacy of loan pricing and risk provisions, improvements of borrower-based indicators and the impact of climate risks and decarbonization.

JEL classification: G18, G21, G28, R30

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This policy paper is an integral part of macroprudential supervision in Austria and contributes to further developing systemic risk analyses in the commercial real estate (CRE) segment. It presents our approach to monitoring CRE funding in Austria and highlights challenges for future work in this field.

This paper is organized as follows: In section 1, we introduce our definition of CRE and present main literature findings and international experience with CRE-induced crises. In section 2, we provide a market overview of CRE funding in Austria, including a European perspective as well. Section 3 deals with risk-related indicators, while in section 4 we discuss macroprudential instruments available for tackling CRE-induced systemic risks. Section 5 concludes and summarizes the main challenges.

## 1 Theory and literature

### 1.1 What is CRE?

The European Systemic Risk Board (ESRB) issued two landmark publications on macroprudential policymaking with regard to CRE: ESRB (2019b), which focuses on methodologies, and ESRB (2016, as amended by 2019a), which concerns real

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Figure 1

**Definition of commercial real estate – an overview**

	Owner is a natural person	Owner is a legal person
Used for dwelling purposes	RRE - owner-occupied - bought/owned to let	CRE - bought/owned to let - used for RRE development - used for social housing
Used for nondwelling purposes	CRE - owner-occupied - bought/owned to let	CRE - used/developed as office space - used/developed as retail space - used/developed for logistical purposes - used/developed for tourism purposes - etc.

Source: Authors' compilation.

Note: RRE = residential real estate.

estate data gaps. Our work is largely supported and influenced by the approach put forward by the ESRB.

CRE can be distinguished from residential real estate (RRE) and other real estate by establishing either (1) whether a property's primary function is residential or not, or (2) how its purpose (i.e. it generates income by being let or sold) combines with the intentions of its owner/investor (i.e. an enterprise wishing to turn its investment into profits, or a household wishing to use it as living space). The first approach is laid down in the European Union's Capital Requirements Regulation (CRR), where according to Article 4 (75) residential property is a "residence that is occupied by the owner or the lessee of the residence," while commercial property is implicitly the remainder. The second approach is embraced by the ESRB (2016, 2019a), Fessenden and Muething (2017) and, for the most part, by us. Between these two main distinctions, three cases stand out: (1) RRE that is owned or acquired by a household to generate income ("bought/owned to let"), (2) RRE owned and rented out by a nonprofit organization, and (3) commercially used real estate that an enterprise uses to conduct its own business. We follow the ESRB in considering the first case to be RRE and the other two to be CRE, as owners' intentions play an essential role in how loans funding these types of properties contribute to systemic risks. In the first case, the owner is a household. In the other two cases, the owners are enterprises, but they do not hold the property with the aim to generate profits through it. By extension, the ESRB treats as CRE loans any loans that fund a property's CRE purposes as described above, but also includes loans that are collateralized by CRE. While we also take into account CRE-collateralized loans that fund non-real estate-related purposes, we focus on loans that fund the development, construction and purchase of real estate. In other words, we take more of a purpose-based and less of a collateral-based approach. Fessenden and Muething (2017) further differentiate between CRE loans that (1) finance the development and construction of property (typically with maturities of up to three years), (2) are commercial mortgages that enable the borrower to acquire an existing property (maturities of up to ten years) and (3) finance multi-family homes that generate rental income. We include loans that finance commercially used property that is to be rented out (e.g. as office or retail space) in this segment (see figure 1 for an overview).

**1.2 CRE (and CRE funding) as a source of systemic risks**

Crowe et al. (2013) find, for a sample of 19 advanced countries, that real estate booms associated with excessive leverage and loan growth have detrimental effects on financial stability and macroeconomic output once they go bust. Moreover, they find that a debt overhang and a weakened financial sector lead to weaker growth

after a real estate-induced financial and economic crisis. They emphasize that what matters here is not the asset boom itself, but how it is funded. Busts are more costly the more heavily the funding of the preceding booms relies on debt (mostly bank loans) and the more highly leveraged institutions (mostly banks) are involved. Booms with limited leverage and the involvement of institutions whose leverage is limited tend to deflate with limited economic consequences. What makes real estate markets stand out among other asset markets is the provision of loans by highly leveraged banks. Davis and Zhu (2011) confirm that banks are crucial in funding the CRE market. Banks grant loans to purchase land for development, to purchase existing buildings and to fund construction. They lend to nonbank financial intermediaries that in turn finance real estate, and they lend to nonfinancial corporations (NFCs) using real estate as collateral. CRE cycles and credit cycles interact via three dimensions: (1) CRE prices affect loan volumes through the wealth effect of changing prices and through the value of the collateral used. The Bank of England (2013) finds that property owners gain additional equity and collateral through rising property prices, which allows them to increase their borrowing. This channel also runs in the opposite direction – increased borrowing pushes prices up and allows for additional equity and collateral. (2) Bank lending provides liquidity. Changes in lending volumes and lending standards impact demand and investment decisions which, in turn, influence real estate prices. (3) Credit and property cycles are driven by common factors, most importantly GDP and interest rates.

For a sample of 23 advanced and 7 emerging market economies, Deghi et al. (2021) find that higher CRE price misalignments drive up risks to GDP growth – an effect that is further amplified by a higher leverage of lenders and borrowers or stronger cross-border funding of commercial real estate. Davis and Zhu (2011) find that CRE markets differ distinctly from markets for other asset classes; specifically the dependence of construction activities on current prices in combination with delivery lags as new constructions take several years to be completed. Therefore, adjustment to changes in the market is slow. Ross et al. (2021) argue that acquisition (of land), development and construction (ADC) loans – a subset of CRE loans as we define them – have often played a significant role in deteriorating bank balance sheets. In a similar vein, the Federal Deposit Insurance Corporation (2013) states that ADC loans are the riskiest class of CRE loans, often involving long development times and properties built on speculation.

### **1.3 Experience with CRE-induced systemic crises**

Crowe et al. (2013) find that out of 46 systemic banking crises more than two-thirds were preceded by boom-bust cycles in house prices. That real estate can be a source of economic shocks also follows from the fact that the construction sector is a significant contributor to value added and employs a substantial share of the labor force. Losses in GDP are three times higher in recessions associated with real estate busts. Considerable commercial real estate bubbles were the savings and loans crisis in the United States at the beginning of the 1980s, the crises in the Nordic countries and Japan at the end-1980s and in the early 1990s, in Australia in the 1990s and in Southeast Asia at the turn of the millennium. Real estate developers played an important role in the real estate crises of the late 2000s in Ireland and Spain. Consequently, Ireland and Spain suffered severe losses from

CRE loans in the aftermath of the global financial crisis (GFC) (ESRB 2019b), which had a detrimental impact on sovereign indebtedness.

Davis and Zhu (2011) find that CRE prices are positively correlated with both GDP and credit in the short run. In the long run, though, the relationship remains positive only with GDP but turns negative with credit. Empirically, CRE prices drive credit more strongly than vice versa.

The Federal Deposit Insurance Corporation (2013) observed growth rates of 221% for ADC loans, 89% for other CRE loans and 78% for multifamily loans between December 2000 and March 2008, while RRE loans grew by 91% in the same period (these numbers correspond to compound annual growth rates of 17%, 9%, 8% and 9%, respectively). The most frequently reported causes of subsequent bank failures were the strong growth of, and high concentrations in, CRE loans. Similarly, Ross et al. (2021) observe, for their sample of ADC loans of failed US banks from 2008 to 2013, that market conditions that signal overheating – such as a higher share of construction loans in total loans and higher growth rates of construction loans – lead to higher losses induced by ADC loans. The Federal Reserve Bank (2017) confirms that from 2008 to 2012, US banks with higher shares of CRE loans in their portfolios were about three times more likely to fail than other US banks. They define highly concentrated portfolios as CRE loans exceeding a threshold of 400% of the bank's risk-based capital. The Federal Deposit Insurance Corporation (2013) notes that for its supervised institutions net charge-offs on ADC loans were three times higher from mid-2008 to end-2010 than for the preceding 17 years. Similarly, Fessenden and Muething (2017) argue that banks with high concentrations of CRE loans in combination with aggressive growth and funding strategies are more prone to failure and that banks that are geographically closer to borrowers benefit from better information on borrowers. Friend et al. (2013) find that 23% of US banks that exceeded both of the two supervisory criteria laid down by the Office of the Comptroller of the Currency (OCC, 2006) failed between 2007 and 2011, while only 0.5% of banks that exceeded neither of the two criteria failed during the same period. These two supervisory criteria were a threshold of 300% of total CRE loans in relation to risk-based capital and CRE lending growth of 50% during the previous 36 months. The OCC (2006) also issued a construction concentration criterion of a 100% of ADC loans in relation to risk-based capital. According to Friend et al. (2013), 13% of banks above that threshold failed. These banks, however, accounted for 80% of the losses to the Federal Deposit Insurance Corporation's insurance fund between 2007 and 2011. Net charge-off rates (gross charge-offs less recoveries) of ADC loans in the US peaked at 8% at the end of 2009 (up from 1% at end-2007), while those of loans for non-owner occupied CRE and those of loans for owner-occupied CRE peaked at only 2% and 1% (up from close to 0%), respectively.

The Bank of England (2013) observes that in the run-up to the GFC, from 2002 to 2006, losses on CRE lending were close to zero but that, from 2008 to 2012, they increased to a total of 6% of CRE loans. Clarke (2018) finds that losses recorded during the GFC outsized previous gains. A critical finding is that two-thirds of the peak CRE loan book were granted in the two years preceding the GFC. These “late-in-the-cycle” loans were also responsible for most of the losses in the following cooldown.

According to Deghi et al. (2021), higher CRE price misalignments drive up risks to GDP growth, an effect that is further amplified by a higher leverage of lenders and borrowers or by stronger cross-border funding of commercial real estate. Macroprudential policies, such as limits to loan-to-value (LTV) ratios, debt service coverage ratios and risk weights are effective in reducing price misalignments. The earlier the measures are introduced, the stronger the effect.

Gyourko (2009) estimates that the average LTV ratio for investment-grade CRE in the United States was 75% in 2008. A publicly traded real estate firm typically has an LTV ratio of 50%, and the riskiest real estate funds have an LTV of 67%. Life insurance companies typically do not grant CRE loans with LTV ratios above 75%. The Bank of England (2013) reports that the average maximum LTV ratio for CRE loans in the UK reached close to 80% at the peak of the cycle before falling steeply to 60% in the years that followed.

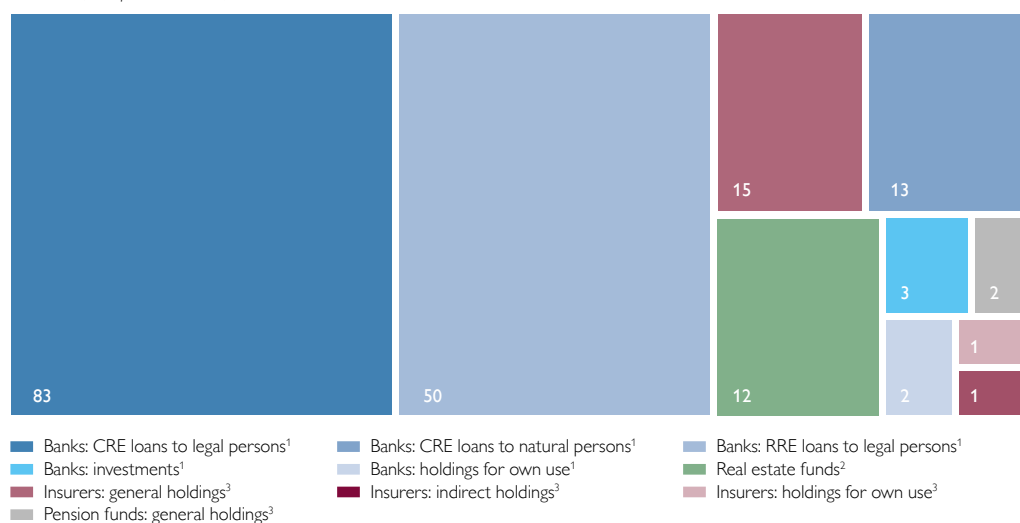
## 2 Market overview

Among financial intermediaries in Austria, banks are the main providers of CRE funding, which mostly takes the form of loans. Chart 1 illustrates the different types of funding, i.e. loans, investments and holdings for own use by banks, real estate funds, insurers and pension funds. The different data sources do not offer perfect comparability due to different definitions and scopes; however, they give a close enough picture of the distribution of Austrian financial intermediaries' CRE funds. Of the total of approximately EUR 180 billion of CRE funding in Austria at end-2021, 80% come in the form of bank loans. Insurers account for 10% with

Chart 1

### CRE funding provided by Austrian financial intermediaries

EUR billion, as of December 31, 2021



Source: OeNB, ECB, EIOPA, authors' calculations.

Note: CRE = commercial real estate; RRE = residential real estate. Banks' loans are collateralized by real estate and cover domestic and cross-border loans but exclude loans granted by foreign subsidiaries.

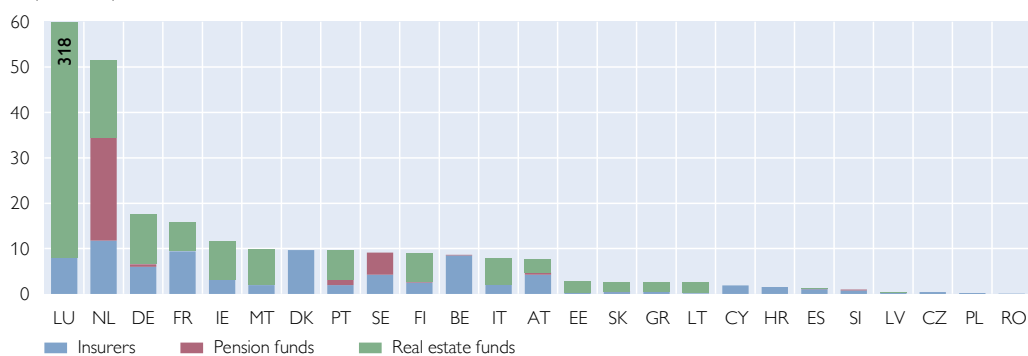
<sup>1</sup> Source: OeNB (banks' own use as of end-2020).

<sup>2</sup> Source: ECB.

<sup>3</sup> Source: EIOPA; authors' calculations.

**CRE exposures of EU nonbank financial intermediaries**

% of GDP, as of December 31, 2021



Source: ECB, EIOPA, OeNB, authors' calculations.

either direct holdings, investments in shares and bonds of real estate companies or funds (the “general” category according to data provided by the European Insurance and Occupational Pensions Authority). 7% are provided by real estate funds. Banks’ and pension funds’ investments make up the remaining 3% and 1%, respectively.

Chart 2 shows that real estate funds in relation to GDP are higher than in Austria in nine other EU countries, with the Netherlands and Germany standing out. Being a central hub for the investment fund industry, Luxembourg overshadows the rest of Europe, with CRE exposures being as high as 318% relative to GDP. Insurers’ CRE exposures are particularly high in Luxembourg, the Netherlands, France, Denmark and Belgium, while the CRE exposure of pension funds is notable in the Netherlands and Sweden.

To assess the inherent risks of commercial real estate lending, we take a top-down approach in analyzing first, how much credit goes to the construction and real estate sectors and second, how much these sectors contribute to total domestic value added. Chart 3 puts bank lending to the construction and real estate sectors into a European context. In Q4 21, loans to real estate companies (i.e. the sectors “construction” and “real estate activities” according to NACE<sup>3</sup>) accounted for 11% of Austrian banks’ total assets, which is only a minor reduction compared to Q4 20 and the fourth highest share in the EU. Only Danish, Finnish and Swedish banks lent more to real estate companies in the same quarter. Austrian banks’ exposure to domestic real estate companies (chart A3) accounted for 8% of banks’ total consolidated assets in Q4 21. One caveat is that the construction sector also comprises construction on and below ground, such as infrastructure and roads, and that a further data breakdown is not available.

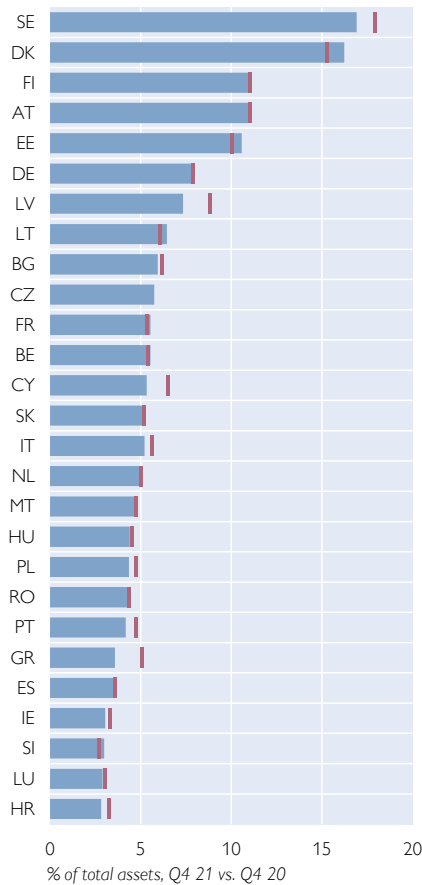
As chart 3 shows, the share of the construction and real estate activities sectors in the total domestic value added to the Austrian economy is 17% at the end of 2021, down 1 percentage point from 2020. This places Austria ninth in an EU-wide comparison, though the reduction holds for all EU countries collectively. When

<sup>3</sup> *Nomenclature générale des activités économiques dans les Communautés Européennes (Nomenclature of Economic Activities).*

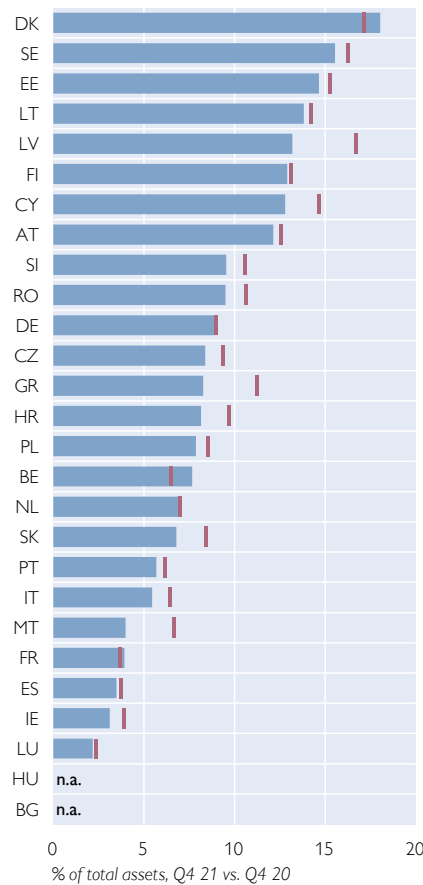
Chart 3

### Credit to construction and real estate sectors, mortgage loans to NFCs and sectors' share in total domestic value added

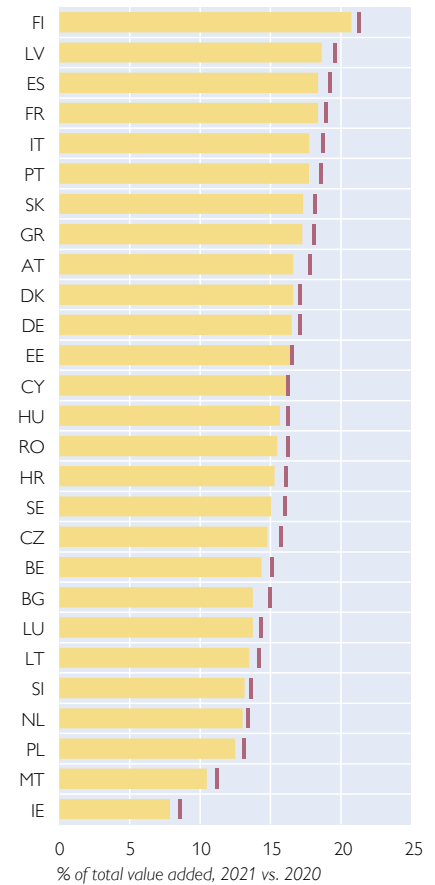
#### Credit to construction and real estate activities sectors (consolidated)



#### Mortgage loans granted to NFCs



#### Share of construction and real estate activities sectors in total domestic value added



Source: ECB, authors' calculations.

Note: The bars indicate Q4 21; the red vertical lines indicate Q4 20; n.a. = not available.

compared to that observed in other EU countries, Austrian banks' exposure to real estate corporations is therefore higher than the share these sectors contribute to the economy. The sector "construction" according to NACE exhibits a more cyclical nature than the sector "real estate activities." While construction contributes an increasing share to total value added in Austria, its current share of 7% remains well below the shares observed in countries that experienced real estate crises in the 2000s. Spain, Ireland and the Baltic countries all recorded shares of above 10% around 2008 that fell sharply in the years that followed.

Narrowing the view on CRE loans, the medium panel of chart 3 shows mortgage loans (consolidated) as a share of total assets in Q4 21 as compared with Q4 20 across the EU. We see that Austrian NFCs' mortgage loans account for a share of 12% in total assets at the end of 2021, down less than half a percentage point from the previous year. This marks Austrian NFCs' importance in the mortgage lending business, which is above the EU average. The three Scandinavian

### Development of mortgage loans in Austria

Share of mortgage loans in total assets



Annual change in mortgage loan volumes



Source: ECB, OeNB, authors' calculations.

countries, the three Baltic countries and Cyprus record higher shares. Interestingly, almost all countries' banking systems reduced NFC mortgage loans as a share of total assets during the pandemic, except in Belgium, Denmark and France, as banks' balance sheets typically increased because of their exposures to central banks.

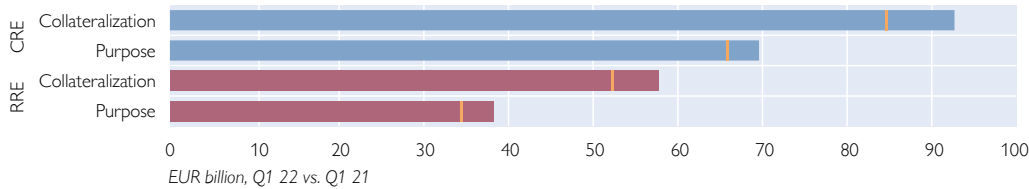
To add a time component to this cross-sectional view, we look at yearly mortgage loan growth versus the share of mortgage loans in total assets in chart 4. Austrian NFCs' mortgage loans stand at 12% of banks' total assets at end-2021. This is markedly lower than the close to 16% of household mortgage loans as household loans have been growing more strongly than NFC loans since 2017. The decline in the share of mortgage loans in total assets since end-2019 is attributable to a stronger rise in total assets than in mortgage loans. The right-hand panel of chart 4 clearly shows a steady and positive year-on-year growth of mortgage loans in Austria for both households and NFCs. At the end of 2021, mortgage loan growth rates stand at 8% and 5%, respectively. Nonetheless, CRE loan growth rates are higher when taking a domestic view: CRE loans to domestic borrowers grew by an annual rate of 7% at the end of 2021 and even by 8% in Q1 22. The dip between mid-2016 and mid-2017 in chart 4 marks the fact that a large Austrian bank shifted its CESEE exposure to its parent headquarters abroad.

In most cases, real estate loans are collateralized by property and therefore classified as traditional mortgage loans although they need not serve the purpose of real estate funding. In the following, we identify loans that are collateralized by either CRE or RRE as well as loans that serve the purpose of real estate funding. In Q1 22, EUR 93 billion of Austrian banks' loans to domestic and foreign borrowers were collateralized by commercial property while only EUR 70 billion were used for the purpose of CRE funding (chart 5). Loans collateralized by RRE amounted to EUR 58 billion while roughly EUR 38 billion were outstanding as RRE funding.



Chart 5

### Real estate loans to legal persons: purpose and collateralization

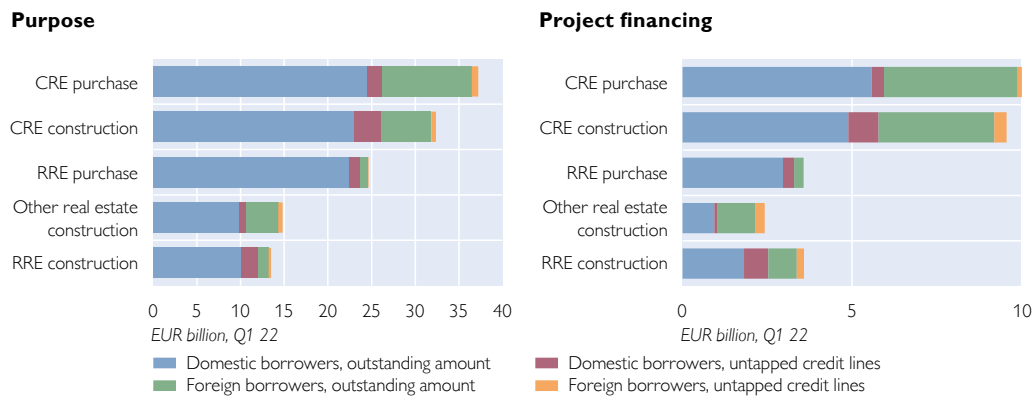


Source: OeNB, authors' calculations.

Note: The bars indicate Q1 22; the vertical lines indicate Q1 21.

Chart 6

### Real estate loans to legal persons: purpose and project financing



Source: OeNB, authors' calculations.

The same findings hold for 2021. A significant amount of real estate-collateralized loans is thus used for other purposes.

Narrowing down the individual purposes of loans (chart 6), we find that most loans are used to purchase CRE property (EUR 37 billion), followed by the purpose of constructing CRE (EUR 32 billion), purchasing RRE property (EUR 25 billion), constructing other real estate (EUR 15 billion) and constructing RRE (EUR 13 billion). The majority of borrowers are domestic (EUR 99 billion, versus EUR 24 billion lent to foreign borrowers).

A major caveat of this analysis is that we can only identify the borrower's and collateral's location but not the location of the funded property. In other words, no information is collected on where the intended purpose is to be realized. Project financing accounts for roughly one-quarter of the entire lending volume described above and is similarly split between the various purposes. Since in project financing, loan repayments solely rely on cash flows directly generated through the project, which in many cases is yet to be built, it is more speculative by nature. Likewise, Ross et al. (2021) and the Federal Deposit Insurance Corporation (2013) identify ADC loans as the riskiest class of loans. In our analysis, we take project financing loans as a proxy for ADC loans.

### 3 Risk indicators

#### 3.1 Concentration and growth risks

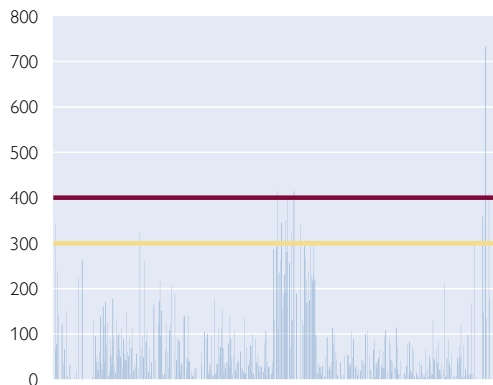
Since granular, loan-level time series data in loadable quality have only been available since 2019, we draw on experience from other countries, following the approach of the US Office of the Comptroller of the Currency (OCC, 2006) and the US Federal Reserve Bank (Fed, 2013). Chart 7 illustrates all individual Austrian banks' exposure to CRE-purposed and/or project financing loans. 14 banks exceed the OCC's 300% threshold while 4 banks even exceed the Fed's threshold of 400% of CRE-purposed exposure in relation to their common equity tier 1 (CET1) capital. For project financing loans, the OCC's threshold is 100%, which is exceeded by 9 banks, while one bank even surpasses the 200% mark. In a next

Chart 7

#### Banks' CRE exposures

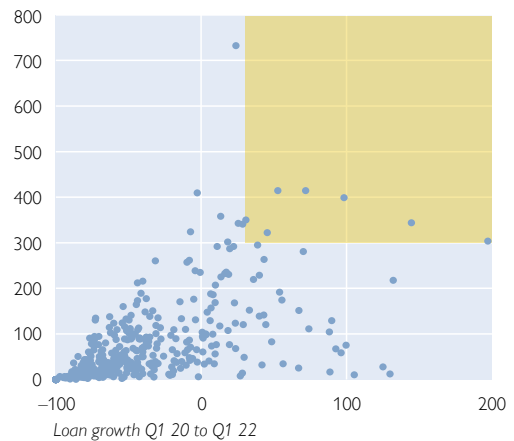
##### CRE-purposed loans

Share in CET1 in %, Q1 22



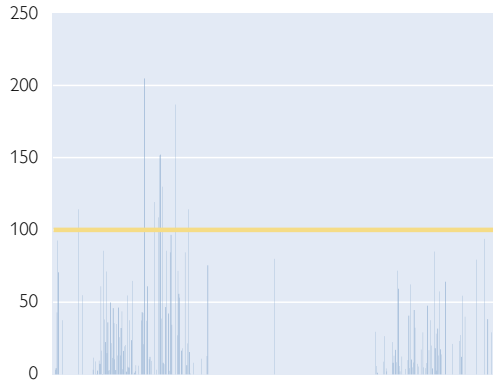
##### CRE-purposed loans vs. two-year growth

Share in CET1 in %, Q1 22



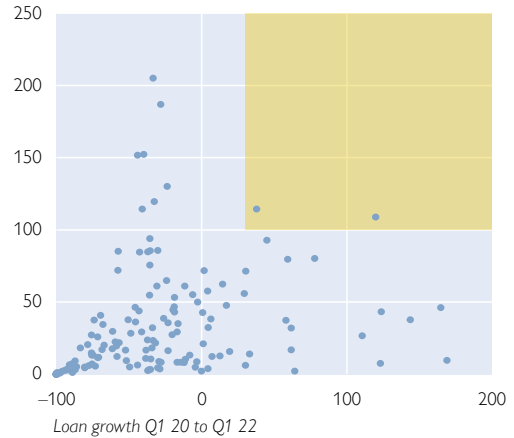
##### Project financing loans

Share in CET1 in %, Q1 22



##### Project financing loans vs. two-year growth

Share in CET1 in %, Q1 22



Source: OeNB, authors' calculations.

Note: Yellow lines indicate moderate risk, red lines indicate significant risk; yellow-shaded areas are critical areas for which both indicators (share of CET1 and high growth) are triggered. Axes are capped for illustration purposes. There are very few banks recording higher values in one of the two cases; however, none of them record higher values in both cases. Blue lines or dots indicate individual banks.

step, we plot banks' exposure as a share of CET1 capital against the growth of CRE-purposed and project financing loans. The OCC recommends remaining below a threshold of 50% growth over three years. Since our time series is limited to two years, we opt for a threshold of 30%. 47 Austrian banks with CRE-purposed financing and 30 banks with CRE project financing loans in their loan portfolios breach this threshold. To form a risk-based measure, the OCC suggests focusing on banks that surpass both thresholds at the same time, which is indicated by the shaded areas in the right-hand panels of chart 7. 7 banks exceed both thresholds for CRE-purposed loans and 2 do so for project financing loans, all of which have negligible market shares.

Guidance by the US authorities states that institutions exceeding the above thresholds should have enhanced credit risk controls in place, including stress testing of CRE portfolios, and that these institutions may be identified for further supervisory analyses. While these criteria were not intended to establish hard limits or caps, they have proven effective in distinguishing vulnerable banks from others in the US CRE crisis during the GFC (see section 1.3).

### 3.2 Nonperforming loans

Going further into the riskiest lending practices, we analyze nonperforming loan (NPL) ratios and loan loss provisions for CRE loans granted by Austrian banks. NPL ratios have continuously been declining since 2016 for both NFCs and households (chart A1). This may indicate a sounder financial system at first; however, state guarantees and further fiscal aid during the pandemic have supported credit quality. Moreover, NPLs are a backward-looking indicator of credit risk and therefore less suitable for macroprudential policy that aims to limit the build-up of systemic risks. Incidentally, losses in the UK were negligible in the run-up to the GFC but skyrocketed thereafter (Bank of England, 2013). Rising NPLs indicate a turning point. Indeed, NPL ratios for CRE loans to NFCs have been rising slightly since 2020. IFRS 9 Stage 2 loans<sup>4</sup> further indicate deteriorating CRE credit quality in a more forward-looking way. The NPL volume of CRE loans taken out in Austria was EUR 2.6 billion in Q1 22 on a consolidated basis (which corresponds to an NPL ratio of 3.4%), EUR 760 million of which stem from CESEE subsidiaries. The IFRS 9 Stage 2 CRE loan volume on a consolidated basis has been rising in Austria since the onset of the pandemic, standing at EUR 23 billion (27% of CRE loans) as of Q1 22.

### 3.3 Collateral-based indicators

Among the most relevant indicators for real estate lending are loan-to-value (LTV) and loan-to-collateral (here: LTC<sup>5</sup>) ratios. In real estate lending, the LTV ratio is one of the most important risk metrics for lenders to assess a borrower's credit-worthiness. We calculate the LTV ratio by dividing the sum of the outstanding amount and untapped credit lines by the market value of the collateral; and we define the LTC ratio as the outstanding amount divided by the total protection value. Crosby and Hordijk (2021) point out that Austria is among the European

<sup>4</sup> *International Financial Reporting Standards (IFRS) 9 Stage 2 loans are loans that have deteriorated significantly in credit quality since their initial recognition but are not yet impaired and do not offer objective evidence of a credit loss event.*

<sup>5</sup> *Not to be confused with loan-to-cost ratios.*

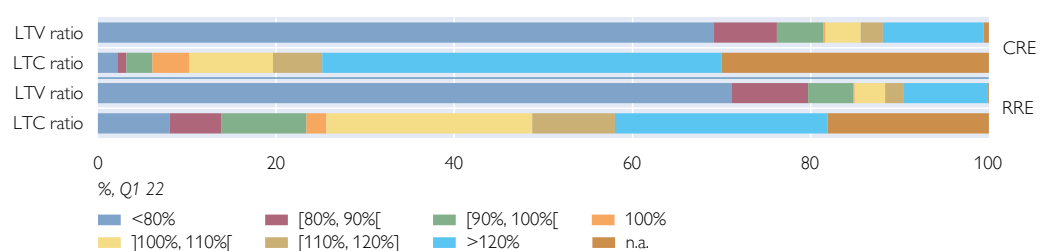
countries that apply a prudent value in lending, i.e. the mortgage lending value as defined in Article 4 (74) CRR. The protection value we apply in calculating the LTC ratio constitutes a lower bound for the mortgage lending value.

As indicated in the introduction, most real estate firms have LTV ratios of around 50% since very rarely are loans granted to companies with LTV ratios higher than 75% and the industry standard requires certain guarantees or an insurance against defaults in the higher LTV brackets. Indeed, the average maximum LTV ratio of CRE loans was below 80% at the peak of the UK CRE cycle during the GFC (Bank of England, 2013). When risks build up, the LTV ratio is the key measure for assessing how leverage in CRE loans is changing. It has the major drawback, however, that it is procyclical and hinges on the valuation method applied to establish the property's value. For the German real estate market, for instance, Reinert (2021) finds that internal valuers tend to deviate further from sales prices than external valuers. Park (2018) reports upward biases in values determined by lenders' internal appraisers or in those selected by the lender. Crosby and Hordijk (2021) emphasize that lending based on static LTV ratios increases available funds that in turn lead to higher prices that again allow for more lending. The LTC ratio at least partly addresses this issue and shows to what extent the banking system is protected in a downturn. Therefore, we use both indicators complementarily. We plot LTV and LTC ratios for both CRE- and RRE-collateralized loans in Austria in chart 8 and examine loans granted to legal persons only. Overall, we see certain buffers for price downturns, as roughly 70% of all loans have LTV ratios of less than 80%. However, the credit line outstrips the market value of the underlying property for 18% of all loans ( $LTV > 100%$ ) in the sample for CRE-collateralized loans and for 14% of all loans in the sample for RRE-collateralized loans.

In a market downturn where the LTC ratio indicates how much of the protection value can be liquidated, it is the lending behavior in the riskier brackets that regulators need to pay special attention to. In the protection perspective, roughly 60% of all loans have an LTC ratio of over 100% for both CRE-collateralized and RRE-collateralized loans. Thus, the sector is largely undercollateralized in case of system-wide defaults, and only a fraction of the actual value of real estate assets could be used to dampen the impact of such defaults. For a large share of loans, collateral is either not identifiable or does not consist of real estate at all, as indicated by "n.a." (not available) in chart 8. Roughly 30% of CRE loans and 15%

Chart 8

### LTV and LTC ratios of CRE- and RRE-collateralized loans to legal persons



Source: OeNB, authors' calculations.

Note: n.a. = not available.

of RRE loans fall into the “n.a.” category. The finding that LTV ratios are higher than LTC ratios indicates that while some collateral is pledged as security, lenders are not fully protected against a borrower’s default.

One explanation for high LTV ratios could be that loans are granted and extended to known borrowers on a rolling basis, which is not an uncommon practice in the Austrian real estate market. For a longitudinal perspective starting in Q4 21, please refer to chart A4.

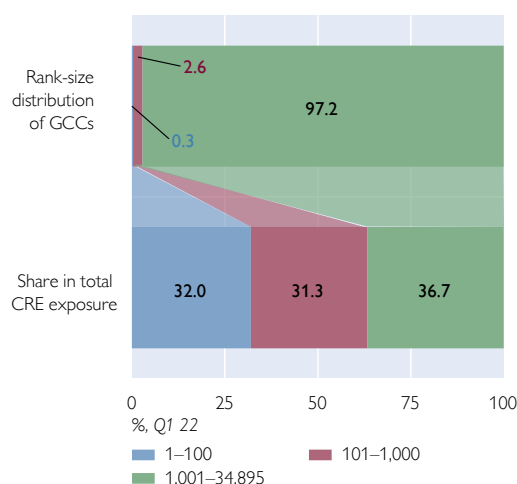
### 3.4 Concentration risk

Concentration risk means the overreliance of a financial firm’s investment portfolio on a single entity or a specific sector. A commonly used and easily applicable measure for concentration is the relative share of market participants in total outstanding exposure. To this end, we look at the largest groups of connected clients (GCCs) of Austrian banks (chart 9) as defined in Article 4 (39) CRR<sup>6</sup>. We find that the largest 100 GCCs (0.3% of the sample) account for EUR 39 billion or 32% of the total CRE- and RRE-collateralized loan exposure of Austrian banks. The next 899 GCCs (3% of the sample) hold 31% (EUR 38 billion) of Austrian banks’ CRE exposure while the remaining 97% (33,894) of GCCs hold 37% (EUR 45 billion). This measure is, however, a crude approximation of concentration risk and warrants further investigation by applying finer calibration and risk metrics. On average, the top 100 GCCs have better ratings than the remaining GCCs. However, the bulk of the top 100 GCCs’ exposure is in bucket 4, which is equivalent to the lowest investment grade rating awarded by major rating agencies.

Chart 9

#### Groups of connected clients: CRE exposure and ratings

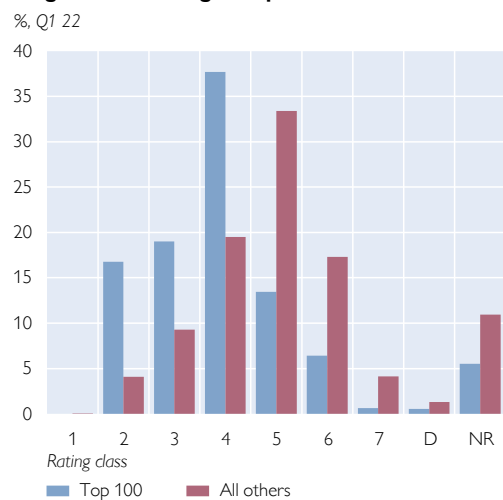
##### Distribution of GCCs’ CRE exposures



Source: OeNB, authors’ calculations.

Note: The chart shows that the largest 100 GCCs account for 0.3% of all clients but for 32% of total CRE exposure; the next largest 1,000 GCCs account for 2.6% of all clients and for 31.3% of total CRE exposure, etc.

##### Largest GCCs’ ratings compared with rest of market



Source: OeNB, authors’ calculations.

Note: D = default, NR = not rated.

<sup>6</sup> See EBA Single Rulebook, Article 4 CRR.

### 3.5 Rating risk

In ESRB (2020), the authors argue that large-scale corporate bond downgrades of NFCs from investment grade (4 and above) to high yield (5 and below), so-called “fallen angels,” can result in system-wide stress. Chart 10 shows the rating distribution of all Austrian companies in comparison with that of Austrian real estate companies (NACE codes F41, F43, L, excluding infrastructure F42). Indeed, on average, real estate companies are found to have substantially lower ratings, especially in pre-default classes 6 and 7. As chart 9 shows, corresponding loans are mostly undercollateralized which, in the case of adverse events, can lead to a propagation of risk through the system. The fact that the collateralized assets of real estate loans are highly illiquid makes adequate risk management by lenders in this segment even more pressing, especially when this analysis is seen together with the cumulated insolvencies shown in the right-hand panel of chart 9. Cumulative insolvencies in the construction and real estate sectors are above those in all other sectors and have almost reached pre-pandemic levels after significant drops in 2020 and 2021 due to large-scale support measures.

The exposure-weighted rating distribution of CRE-purposed loans to NFCs exhibits a slight shift toward the mid-lower end from the end of 2019, though with less exposure in the pre-default categories 6 and 7 or in default (chart A2).

Davis and Zhu (2011), Ross et al. (2021) and the FDIC (2013) hypothesize that CRE construction loans are riskier than loans funding CRE purchases. Our analysis partially confirms this theory. CRE construction loans granted by Austrian banks in Q1 22 exhibit higher default rates (1.5%) than loans funding CRE purchases (1.2%). However, NPLs financing RRE construction are significantly below their RRE purchasing counterpart (0.3% and 0.7%, respectively). Default rates of RRE construction loans benefited from an exceptional boom over the past few years; it remains to be seen if and to what extent the economic slowdown and rising interest rates will have an impact on default rates.

Chart 10

#### Ratings and insolvencies of real estate companies

##### Rating distribution: real estate companies vs. all companies

%, Q1 22



Source: OeNB, authors' calculations.

Note: D = default, NR = not rated.

##### Cumulated insolvencies in the construction and real estate sectors

Number of insolvencies per calendar year

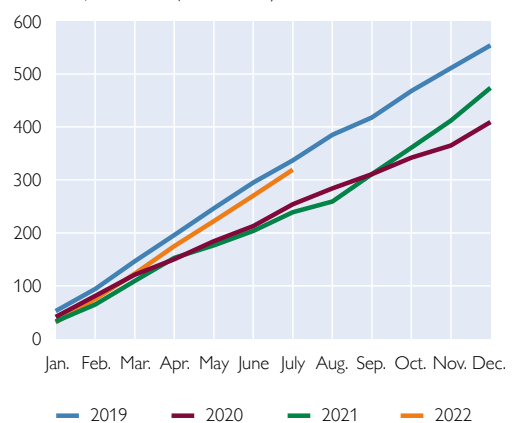


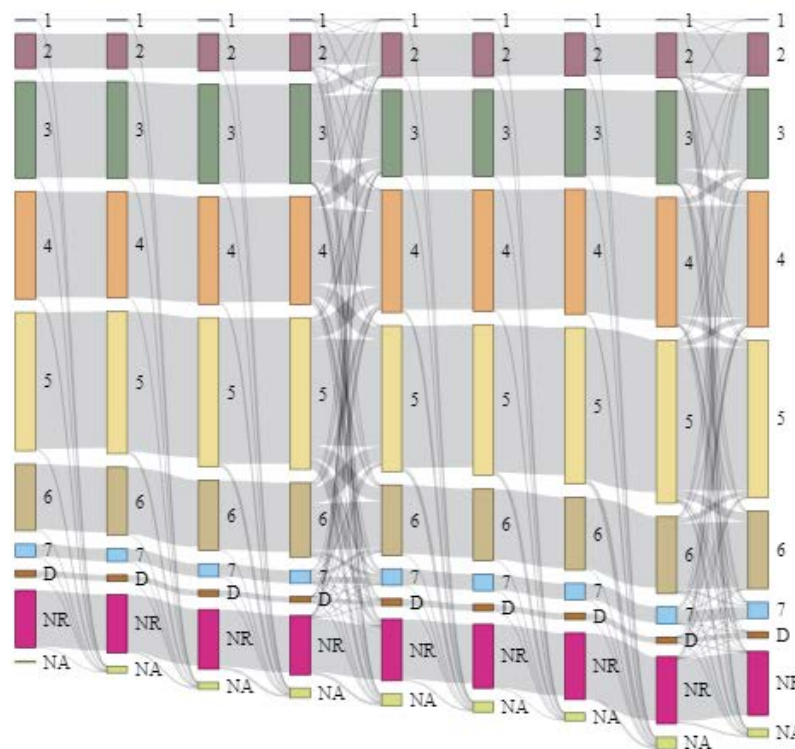
Chart 11 illustrates the rating migrations of loans granted by Austrian banks to NFCs for the purpose of CRE funding. A striking characteristic are the rating migrations between Q4 20 and Q1 21 and between Q4 21 and Q1 22, while in the other periods movements toward the “NA” (not available) brackets are prevalent. One explanation for this phenomenon could be that banks wait for the respective borrowers to publish their annual financial statements, including any (re)valuation of properties’ market values, on which to base their ratings.

Between Q4 20 and Q1 21, downgrades in the rating classes 3, 4 and 5 overshadow upgrades in the same classes in spite of a significant amount of exposure that was upgraded from rating class 6 to 5. Rating migrations from class 7 and default (“D”) are not of a comparatively significant size and exhibit net upgrades rather than downgrades. This indicates a shift in the distribution of ratings toward the lower end despite the better performance of pre-default classes over less risky classes.

Between Q4 21 and Q1 22, the picture reverses since downgrades from rating class 3 to rating class 4 outnumber the upgrades from all buckets. Particularly striking are the consistently small fractions of loans in pre-default class 7 and in default over the entire sample period. This may largely be due to fiscal and monetary support measures in combination with booming real estate markets, an explanation that is also supported by chart 10, which shows significantly lower insolvencies in the same period than before the pandemic.

Chart 11

### Rating migrations of CRE loans



Source: OeNB, authors' calculations.

Note: D = default, NR = not rated, NA = not available

#### 4 Macprudential instruments in the EU and Austria

EU legislation provides various instruments to increase banks' risk-absorbing capacities if systemic risks are deemed to be excessive. According to the Capital Requirements Regulation (CRR), a macroprudential authority may change the risk weights of CRE loans under the standardized approach (Article 124 CRR) and introduce minimum loss-given-default values under the internal ratings-based approach (Article 164 CRR). Article 458 CRR provides a more general clause on changing risk weights of CRE exposures when facing systemic risks. Its advantage is that it enables the direct steering of risk weights under the internal ratings-based approach, but at the cost of more elaborate safeguard procedures by EU authorities and of subsidiarity to other measures. Article 133 CRR (EBA, 2020) allows for the implementation of a systemic risk buffer for CRE exposures.

Moreover, Austrian legislation provides borrower-based measures for tackling systemic risks in real estate lending according to Article 23 lit h Austrian Banking Act. These measures can be applied to both households' and corporates' (i.e. legal persons') real estate loans. They encompass limits to loan-to-value ratios, debt-to-income ratios (or a suitable measure that relates overall indebtedness to viable income figures for legal persons), debt service-to-income ratios (or a suitable measure that relates overall debt servicing costs to viable income figures for legal persons), terms to maturities and amortization requirements. Currently, borrower-based measures are not laid out in EU legislation. Internationally, only a limited number of measures have been implemented to curb systemic risks in CRE markets (BIS, 2022).

Among borrower-based measures, only data for LTV and LTC ratios are easily available while data for measures based on cash flows, costs and income constitute the most pressing gaps in supervisory databases. The latter come with the major drawback of being based on projections carried out for a major, and riskier, part of loan portfolios. The most important income- or cost-based lending indicators are the loan-to-cost ratio<sup>7</sup>, interest coverage ratio<sup>8</sup>, debt service coverage ratio<sup>9</sup> and the credit multiplier<sup>10</sup> (Wendlinger, 2018). The European Banking Authority (EBA, 2020) additionally proposes to apply a modified credit multiplier, the total debt-to-EBITDA<sup>11</sup> ratio, to legal persons. As there are no uniform rules on how to generate the necessary projections, data comparable across various lenders are difficult to come by and the resulting data gaps cannot easily be mended. Further nonnegligible challenges in implementing macroprudential measures targeting CRE funding are the heterogeneity of borrowers, funding strategies and types of properties, especially when compared to RRE funding.

<sup>7</sup> The loan-to-cost ratio measures the leverage on the level of the funded property and relates a loan exposure to total investment costs.

<sup>8</sup> The interest coverage ratio measures the ability of a project to cover its interest costs and relates net operating income to interest costs.

<sup>9</sup> The debt service coverage ratio extends the perspective on interest costs to total debt servicing costs by dividing net operating income by the sum of interest rate costs and debt redemption. Debt redemption can either be by regular instalments or at maturity.

<sup>10</sup> The credit multiplier relates total loan exposure to net operating income.

<sup>11</sup> EBITDA: earnings before interests, taxes, depreciation and amortization.



## 5 Conclusions

In this paper we focus on commercial real estate (CRE) loans, i.e. real estate loans granted to nonfinancial corporations and used to fund either commercial or residential property as well as real estate loans granted to individuals and used to fund commercial property. The definition of CRE loans by type of collateral, i.e. mortgage loans, provides a supplementary, but secondary perspective. Since CRE-induced systemic risks first and foremost emanate from the leverage (i.e. loans) provided by highly leveraged institutions (i.e. banks), and banks remain the dominant source of debt capital in CRE funding, we focus on CRE bank loans. At the same time, we will continue to monitor funds provided by other financial intermediaries as well.

In an EU-wide comparison, CRE loans are of above-average importance to Austrian banks' business models, while the relevance of other financial intermediaries' CRE funds do not stand out in Austria. CRE loan growth rates in Austria have recently reached levels that warrant heightened alertness by macroprudential supervisors. Yet, only a few Austrian banks have so far exceeded critical concentration and growth thresholds. Related developments will be continuously monitored and supervisory action will be considered if deemed necessary.

The median loan-to-value (LTV) levels of Austrian banks' CRE loans exhibit moderate risk by international standards; however, a substantial share of LTV ratios is above 80% or even 100%. This applies both to CRE loans that fund commercial property and to CRE loans that fund residential property. A source of concern is that over half of all CRE loans taken out in Austria are undercollateralized, i.e. in only half of all cases, lenders have access to collateral high enough to cover a total loan default. A high share of Austrian CRE loans is not collateralized at all. The reasons behind this situation will be subject to future investigation and, potentially, a case for further macroprudential action.

Risks from concentrated exposures vis-à-vis a few groups of connected clients cannot be ruled out. Rating migrations have so far not exhibited critical patterns as a booming real estate market has combined with generous fiscal and monetary policies in the wake of the COVID-19 pandemic. Both banks and supervisors will need to monitor how the forecast economic downturn and interest rate increases will impact rating migrations and the market values of CRE collateral. Further research on whether loan pricing and risk provisioning adequately reflect CRE risks will be necessary.

A host of macroprudential instruments are available to tackle systemic risks stemming from banks' CRE loans – capital-based measures based on EU law and borrower-based measures based on national law. Creating income-based indicators as a subset of borrower-based indicators remains a challenge to be tackled. Our assessment of a potential credit-price spiral is limited as reliable data on CRE price developments are still lacking. This will, however, be mended by improved data availability from 2023.

Finally, this paper does not touch upon the impact of decarbonization on CRE. The transition to less energy-intensive properties will pose both an opportunity for, and a hazard to, CRE loans.

For supervisors and banks alike, the continued monitoring of CRE loan growth and concentrations, the reasons behind high loan-to-value and loan-to-collateral ratios, the impact of higher interest rates and/or an economic downturn on

CRE market valuations, as well as the adequacy of loan provisions and pricing require further attention. The implementation of borrower-based indicators, the identification of further data needs as well as climate risks and decarbonization-related risks on CRE markets continue to provide rich grounds for future research.

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## Annex

### Abbreviations

Table A1

#### Countries

AT	Austria	FR	France	NL	Netherlands
BE	Belgium	GR	Greece	PL	Poland
BG	Bulgaria	HR	Croatia	PT	Portugal
CY	Cyprus	HU	Hungary	RO	Romania
CZ	Czechia	IE	Ireland	SE	Sweden
DE	Germany	IT	Italy	SI	Slovenia
DK	Denmark	LT	Lithuania	SK	Slovakia
EE	Estonia	LU	Luxembourg	UK	United Kingdom
ES	Spain	LV	Latvia	US	United States
FI	Finland	MT	Malta		

Source: Authors' compilation.

Table A2

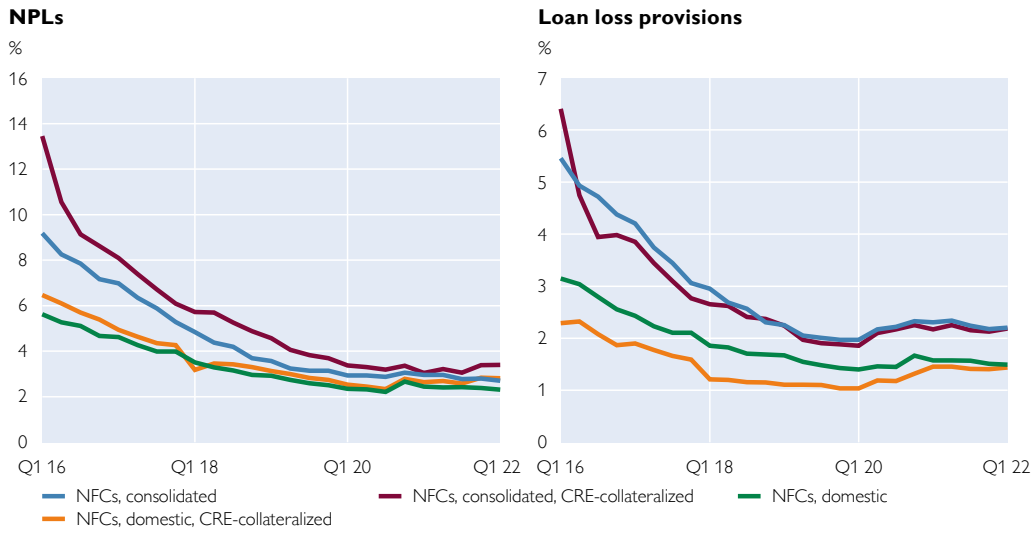
#### Other abbreviations

ADC	Acquisition, development and construction
BIS	Bank for International Settlement
CESEE	Central, Eastern and Southeastern Europe
CET1	Common equity tier 1
CRD	Capital Requirements Directive
CRE	Commercial real estate
CRR	Capital Requirements Regulation
EBA	European Banking Authority
EBITDA	Earnings before interests, taxes, depreciation and amortization
ECB	European Central Bank
EIOPA	European Insurance and Occupational Pensions Authority
ESRB	European Systemic Risk Board
EU	European Union
FDIC	Federal Deposit Insurance Corporation
FED	Federal Reserve Bank
GCC	Groups of connected clients
GDP	Gross domestic product
GFC	Global financial crisis
IFRS 9	International Financial Reporting Standard 9
LTC	Loan-to-collateral
LTV	Loan-to-value
NACE	Nomenclature générale des activités économiques dans les Communautés Européennes (Nomenclature of Economic Activities)
NFC	Nonfinancial corporation
NPL	Nonperforming loan
OCC	Office of the Comptroller of the Currency
RRE	Residential real estate

Source: Authors' compilation.

Chart A1

### NFC loans in Austria: nonperforming loans and loan loss provisions

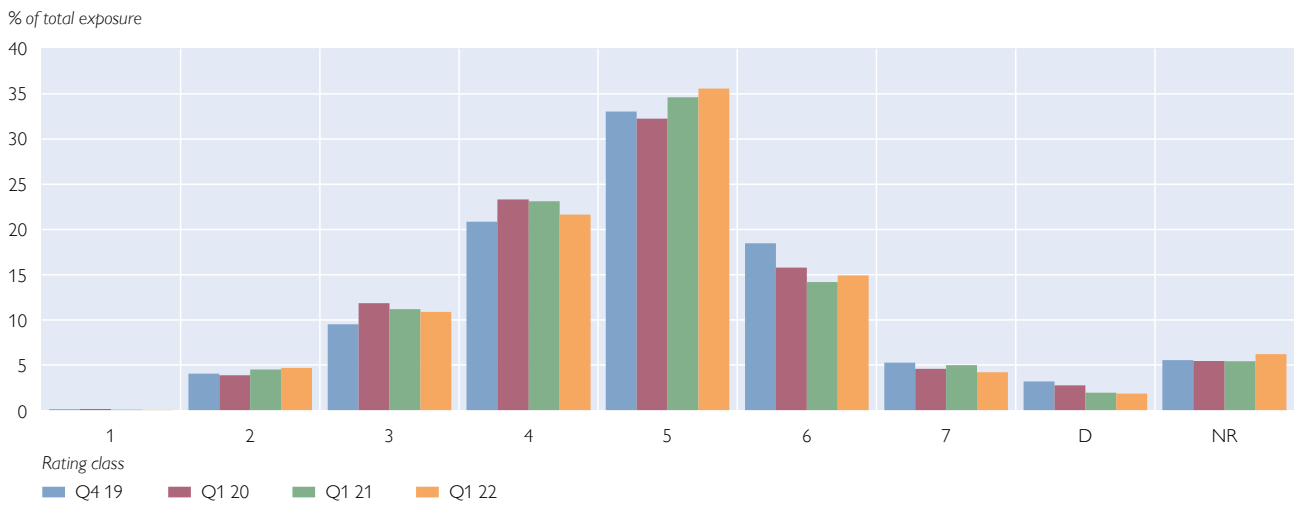


Source: ECB, OeNB, authors' calculations.

Note: NFCs = nonfinancial corporations.

Chart A2

### Rating distribution of CRE-purposed loans



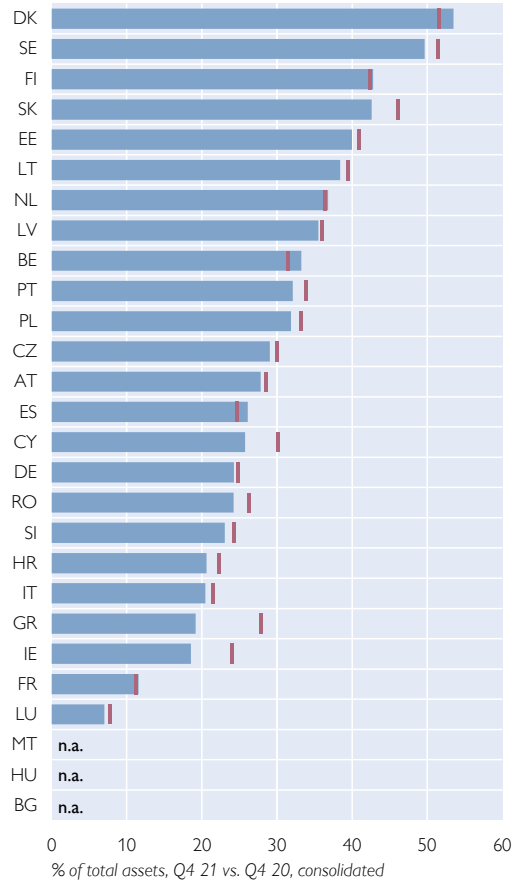
Source: OeNB, authors' calculations.

Note: D = default, NR = not rated.

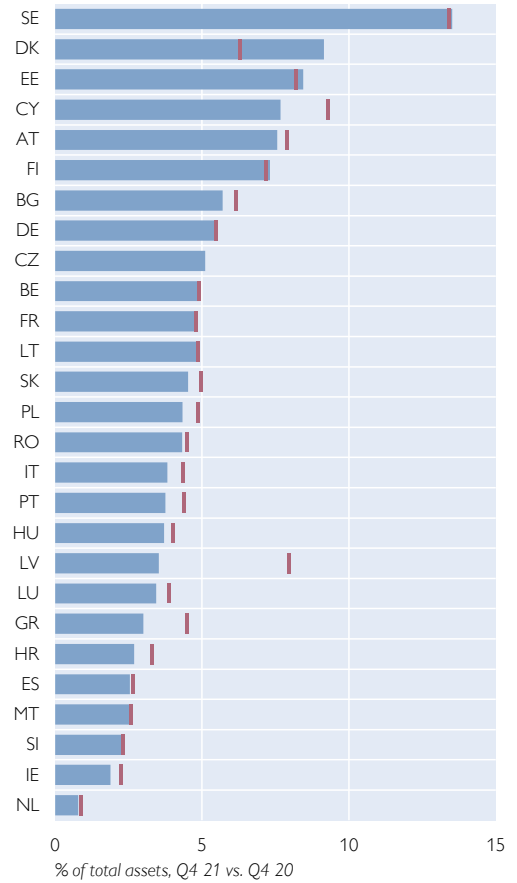
Chart A3

**EU-wide comparison: mortgage loans and credit to domestic real estate companies**

**Mortgage loans to NFCs and households**



**Credit to construction and real estate activities sectors (domestic)**



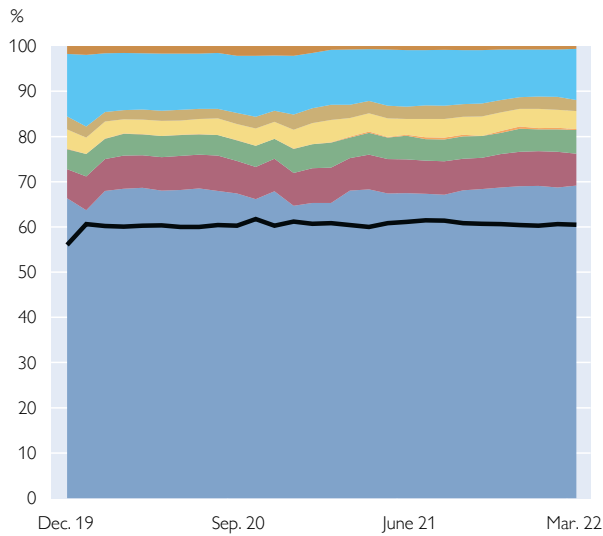
Source: ECB, authors' calculations.

Note: The bars indicate Q4 21; the red vertical lines indicate Q4 20; n.a. = not available.

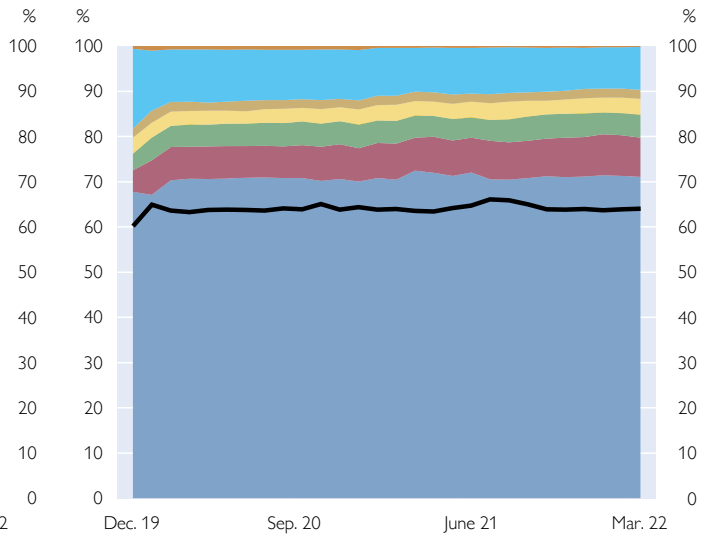
Chart A4

**Development of LTV and LTC ratios in Austria**

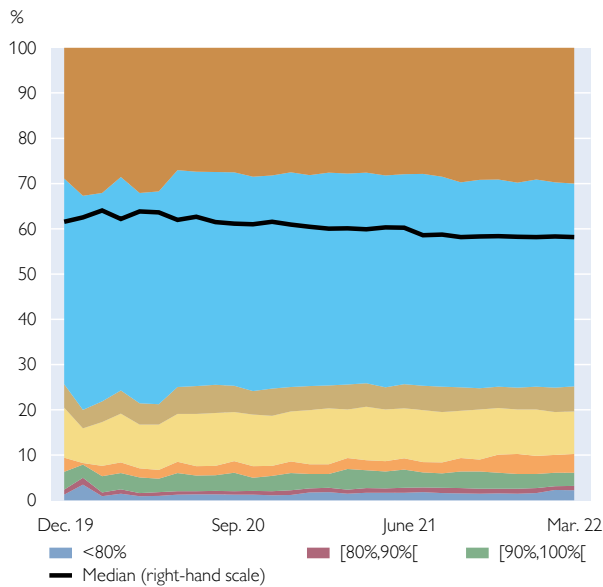
**LTV ratio of CRE-collateralized loans**



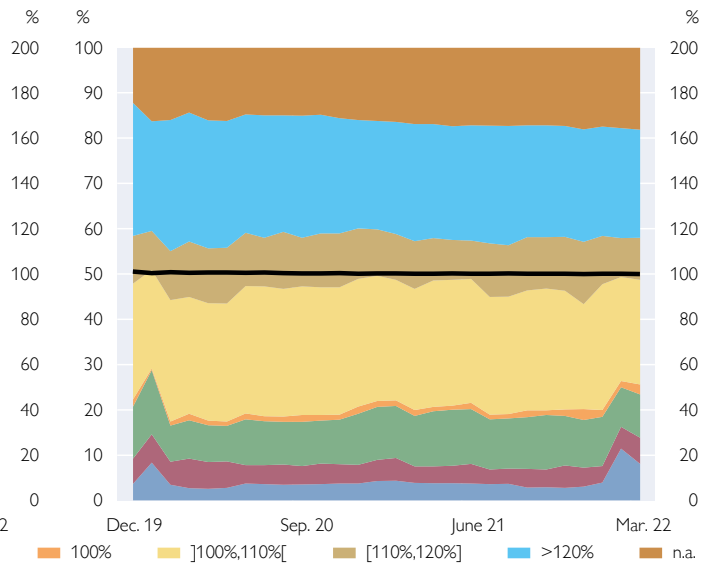
**LTV ratio of RRE-collateralized loans**



**LTC ratio of CRE collateralized loans**



**LTC ratio of RRE-collateralized loans**



Source: OeNB, authors' calculations.

Note: Loans to natural persons are not included; n.a. = not available.